



Building something great

Pre-mix concrete EPD

Environmental Product Declaration

Northern Territory (NT) region



In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019

An EPD should provide current information and may be updated if conditions change.

The stated validity is therefore subject to the continued registration and publication at epd-australasia.com

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Geographical Scope: NT region





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Program information and verification

An Environmental Product Declaration (EPD) is a standardised way of quantifying the potential environmental impacts of a product or system. EPDs are produced according to a consistent set of rules—Product Category Rules (PCR)—that define the requirements within a given product category.

These rules are a key part of ISO 14025, ISO 14040 and ISO 14044 as they enable transparency and comparability between EPDs. This EPD provides environmental indicators for Boral ENVISIA® ENVIROCRETE®, ENVIROCRETE® PLUS, products for special applications and our normal class of pre-mix concrete products manufactured in Australia. This EPD is a 'cradle-to-gate' declaration covering production of the concrete and its supply chain.

This EPD is verified to be compliant with EN 15804. EPD of construction products may not be comparable if they do not comply with EN 15804. EPDs within the same product category but from different programs or utilising different PCRs may not be comparable. Boral, as the EPD owner, has the sole ownership, liability and responsibility for the EPD.

Declaration owner		Boral	Address Level 3, Triniti 2, 39 Delhi Road, North Ryde NSW 2113 W boral.com.au T +61 2 9220 6300
Program Operator		EPD International AB	Address EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden E info@environdec.com
Regional program Operator		EPD Australasia Limited	Address 315a Hardy Street, Nelson 7010, New Zealand W epd-australasia.com T +61 2 8005 8206 E info@epd-australasia.com
EPD produced by		Rob Rouwette, start2see	Address 36 Renaissance Boulevard Mernda Vic 3754, Australia W start2see.com.au T +61 403 834 470 E Rob.Rouwette@start2see.com.au
Third Party Verifier accredited or approved by EPD Australasia Ltd.		Andrew D. Moore, Life Cycle Logic	Address PO Box 571, Fremantle WA 6959, Australia W lifecyclelogic.com.au T +61 4 2432 0057 E andrew@lifecyclelogic.com.au

Program information and verification

EPD version:	Description of the changes
Version 1	The results in this EPD cover individual products manufactured at a single location.
Version 2	The following edits were made as part of the first annual review. <ul style="list-style-type: none"> • File name, registration number and version format updated • Program operator information updated
Reference year for data:	2018-01-01/2018-12-31

CEN standard EN 15804 served as the core PCR

PCR	PCR 2019:14 Construction Products, version 1.11, 2021-02-05 (valid until 2024-12-20) c-PCR-003: Product Category Rules (PCR) for Concrete and Concrete Elements (EN 16757) 2019-12-20 (valid until 2024-12-20)
PCR review was conducted by	The Technical Committee of the International EPD® System. Chair: Claudia A. Peña. Contact via info@environdec.com
Independent verification of the declaration and data, according to ISO 14025	<input type="checkbox"/> EPD process certification (Internal) <input checked="" type="checkbox"/> EPD verification (External)
Procedure for follow-up of data during EPD validity involved third-party verifier	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes



About Boral

Boral is the largest integrated construction materials company in Australia, with a leading position underpinned by strategically located quarry reserves and an extensive network of operating sites. We also manufacture and supply a range of building products.

Boral Concrete has over 200 pre-mix concrete plants around Australia producing a wide range of concrete mixes in metropolitan and country areas.

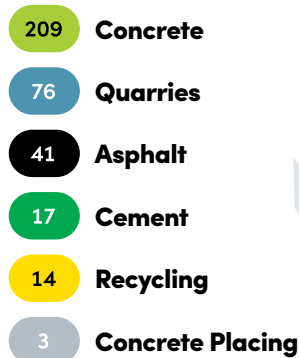
In Western Australia, Boral Concrete supplies pre-mix concrete to all segments of the construction industry including infrastructure, social, commercial, and residential construction.

This EPD covers the majority of the concrete products supplied from Boral plants in Perth.

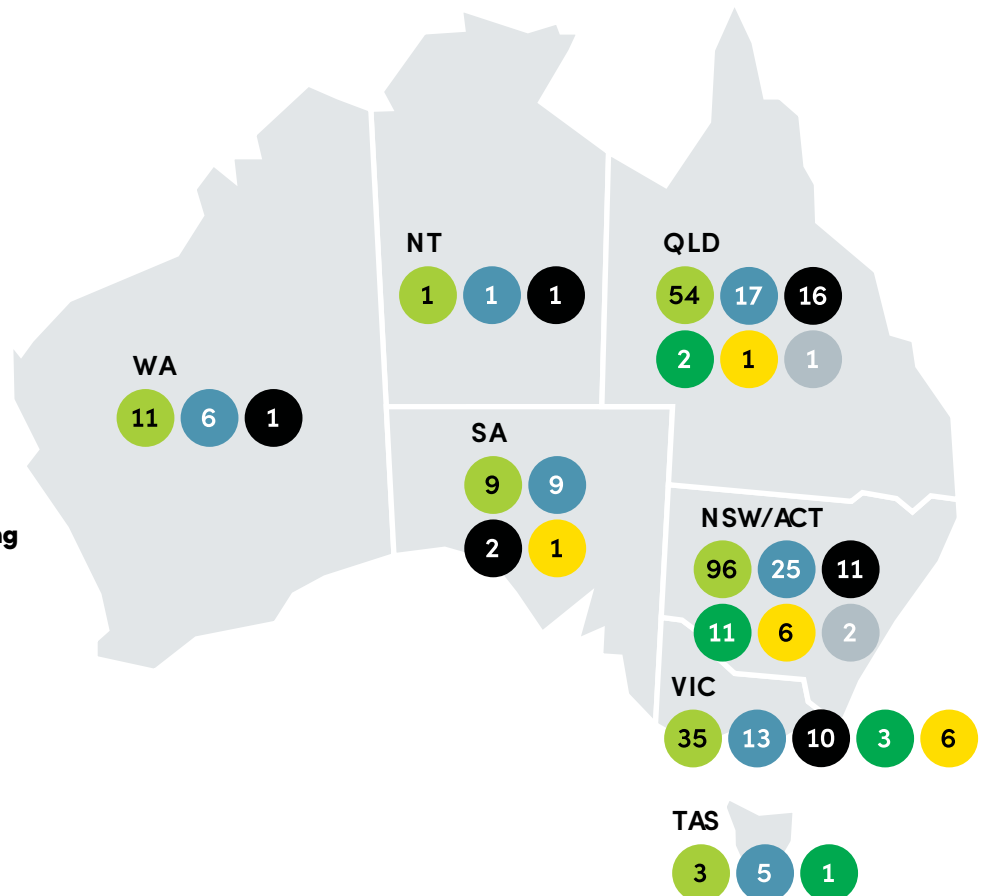
Construction materials Leading integrated network

360

Operating sites*



* Includes transport, fly ash and research and development sites.



About Boral

ZERO HARM
TODAY

How we work

At Boral, we have a culture of ‘working together’ with a focus on Zero Harm Today.

This ensures all of our employees, contractors, partners and communities in which we operate are free from harm, injury and illnesses.

Boral has a team of full-time Health, Safety, Environment and Quality specialists who operate across our integrated business, offering a single interface for safety communications and innovation across raw materials, logistics, operations and placement.

Innovation and technical capability

The Innovation Factory is Boral’s in-house centre of excellence responsible for developing advanced cement and concrete solutions for our customers.

Through consultation with our customers, the Innovation Factory is central to enabling transformation through innovative products at Boral.

Our focus on engagement and action is backed by intensive research and development through our dedicated and talented team who work in collaboration with many sections of the company to create a world of future generations will be proud of.



About Boral

Technical services

As one of Australia's largest construction materials companies, Boral is committed to excellence, providing customers with quality products and reliable service.

"Boral Materials Technical Services is also the largest facility of its kind in the country."

Our aim is to provide products backed up by specialised testing as well as extensive quality control testing and technical support.

To ensure we remain at the forefront, we constantly improve, develop and refine our products to maintain the high standards customers have come to expect.

Our production, technical and quality managers are committed to quality excellence in our manufacturing process. We have committed additional resources to research and we strive to develop whole-of-life solutions that offer a sustainable future. Our innovative products are designed in collaboration with our clients.

Not only are we the only Australian construction materials company to maintain a full-service construction materials laboratory in Australia, Boral Materials Technical Services is also the largest facility of its kind in the country, providing special and standard testing and product development services to Boral and our customers.

Boral maintains an ISO 9001-certified Quality System to ensure we conduct a regular regime of physical properties testing on all materials to certify they:

- meet Australian Standards in the civil and structural construction industry
- comply with applicable legislation, regulations and industry standards
- meet project specifications
- allow for continuous improvement.

Boral laboratory facilities have a quality management system that meets international standards and they are NATA-accredited for construction materials testing and chemical testing. These customer-focused services have earned Boral the reputation of a market leader in its approach.



About Boral

Sustainability at Boral

We recognise that our commitment and progress in managing sustainability outcomes is vital to our business and meeting the expectations of our customers.

We strive to:

- **Deliver** innovative, superior performing and more sustainable products and solutions that respond to a changing world and better meet our customers' needs
- **Drive** safety performance towards world's best practice and invest in our people to enable them to deliver on our strategy
- **Reduce** our environmental footprint and build our resilience to climate impacts
- **Be** a socially responsible member of the communities in which we operate.

In recent years, we have substantially reshaped our business to respond and adapt to changing commercial, technological, and environmental factors. We have invested in growing our lower carbon concrete products.

We are increasing our investment in innovation to enable us to expand our products and solutions that have a lower carbon footprint and thereby positively contribute to an effective transition to a lower carbon economy.

Boral's ENVISIA® and ENVIROCRETE®/PLUS products underpin this improved sustainable concrete range. We monitor and report on our sustainability performance to drive progress and continuous improvement and are responding to increasing expectations of our customers on the disclosure of our sustainability risks and opportunities.

Our commitment

ZERO HARM
TODAY

Our overarching goal is to deliver Zero Harm Today. This means we target zero injuries to our people and seek to eliminate adverse environmental impacts.

Where elimination is not possible, we seek to minimise any harmful effects from our operations. At an absolute minimum, this means complying with environmental legislation, regulations, standards and codes of practice.

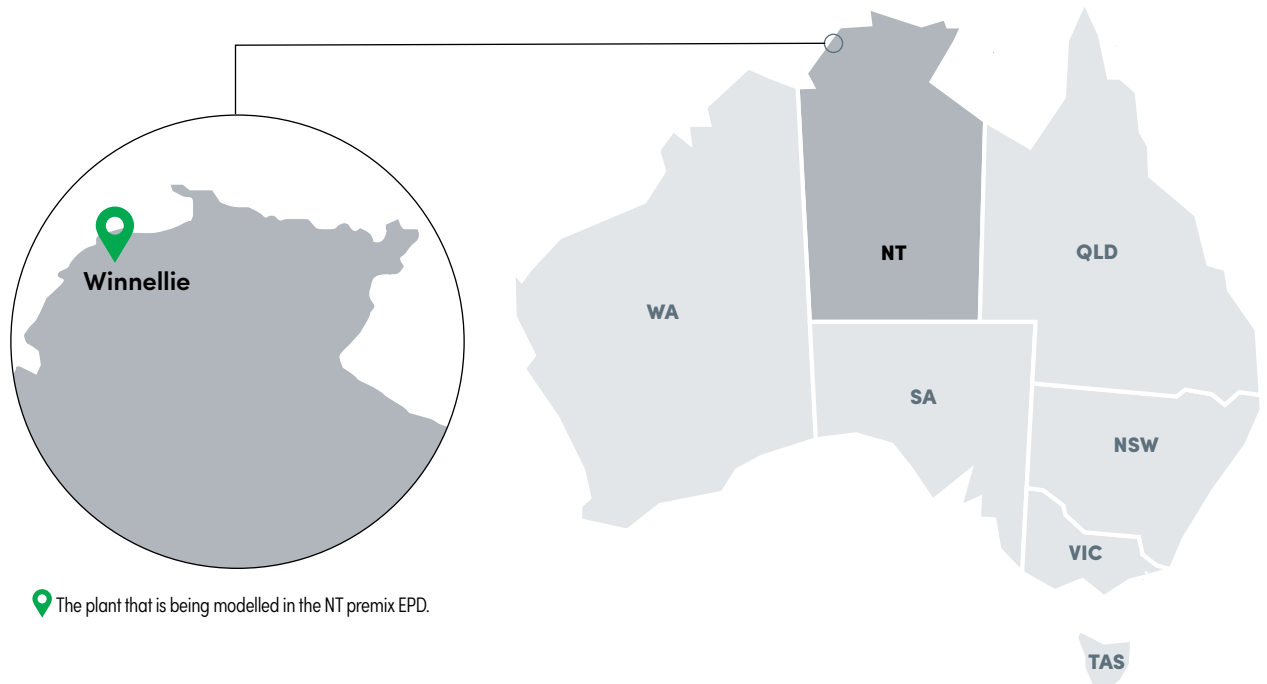
- **Reducing greenhouse gas** emissions from our processes, operations and facilities.
- **Reducing waste** in all forms including through the efficient use of energy, conservation of water, minimising and recycling waste materials and energy, prevention of pollution, and effective use of virgin and recovered resources and supplemental materials.
- **Protecting biodiversity** values at and around our facilities.
- **Openly and constructively engaging** with communities surrounding our operations.


Geographical scope

Northern Territory Region



The concrete plant considered for this Environmental Product Declaration is Boral Winnellie.



 The plant that is being modelled in the NT premix EPD.

Declared products

Products considered for the Northern Territory (NT) region Environmental Product Declaration

The products considered for the EPD fall into three broad categories: **normal class products, lower carbon concrete products and special concrete products.**

A brief description of each category is given below, followed by a full list of the products.

1) Lower carbon concrete products

Lower carbon concrete products have been designed to have lower portland cement contents and lower embodied carbon contents. The lower carbon concrete products have been further categorised according to their portland cement reduction and their performance, as per the sub categories below.

Lower carbon concrete product	Portland cement reduction*	Typical properties
ENVIROCRETE®	≥40%	<ul style="list-style-type: none"> Complies with AS 1379. Applicable for Green Star projects.
ENVIROCRETE® PLUS	≥45%	<ul style="list-style-type: none"> Complies with AS 1379. Applicable for Green Star projects. Improved early age strength and drying shrinkage compared to the ENVIROCRETE® products.
ENVISIA®	≥50%	<ul style="list-style-type: none"> Complies with AS 1379. Applicable for Green Star projects. Improved early age strength and drying shrinkage compared to the ENVIROCRETE® and ENVIROCRETE® PLUS products.

* The percentages indicate the typical portland cement reduction against default concrete mixes as defined in the Green Star and ISC Rating tools by the Green Building Council of Australia (GBCA) and the Infrastructure Sustainability Council (ISC) respectively.

Declared products

ENVIROCRETE® concrete

Boral's ENVIROCRETE® concrete is a lower carbon concrete product which complies with AS 1379.

It contains supplementary cementitious materials to reduce the portland cement content and the embodied carbon content of the concrete and is suitable for projects targeting a lower carbon footprint.

ENVIROCRETE® has a minimum portland cement reduction of 40% when compared to the GBCA reference case and is suitable for projects targeting a Green Star rating and where good early age strength or low drying shrinkage are not required.

ENVIROCRETE® PLUS concrete

Boral's ENVIROCRETE® PLUS concrete is a lower carbon concrete product which complies with AS 1379.

It contains supplementary cementitious materials to reduce the portland cement and the minimum reduction in portland cement compared to the GBCA and ISC reference case is 45%. ENVIROCRETE® PLUS also has enhanced engineering properties compared to the ENVIROCRETE® range. The early age strength and drying shrinkage are superior to ENVIROCRETE®.

ENVISIA® concrete

Boral's ENVISIA® concrete is a lower carbon concrete product which complies with AS 1379 and has excellent engineering properties. It contains supplementary cementitious materials to reduce the portland cement and the minimum portland cement reduction compared to the GBCA and ISC reference case is 50%. ENVISIA® combines a proprietary cement technology (ZEP®) which gives it good early age strength, low shrinkage characteristics and excellent durability characteristics. An overview of the sustainability, durability, engineering and architectural properties are given below.

Lower carbon

- ENVISIA® has a low portland cement content and is suitable for projects seeking to maximise the number of green star points from concrete.
- ENVISIA® has a lower carbon content and is suitable for projects seeking a rating with the Green Building Council of Australia (GBCA) or the Infrastructure Sustainability Council (ISC).

Workability

- ENVISIA® can be placed, pumped and finished like conventional concrete.

Superior engineering properties

- ENVISIA® will achieve early-age strength equivalent to conventional concrete mixes with higher portland cement content (e.g. post-tensioned and precast concrete.)
- ENVISIA® has 20 percent greater flexural strength compared to conventional concrete of the same grade.
- ENVISIA® achieves up to 50 percent reduction in shrinkage when compared to conventional sustainable concrete mixes.

Superior durability

- ENVISIA® provides improved durability, through greater protection to steel reinforcement against chloride induced corrosion.
- ENVISIA® has improved sulphate and acid resistance properties.
- ENVISIA® mitigates the potential expansion due to alkali aggregate reactivity.

Architectural presence

- ENVISIA® can achieve a range of architectural benefits because of its off-form finish and lighter colour.
- ENVISIA®'s lighter colour will enhance the use of coloured oxides.

Declared products

2) Lower carbon concrete products for special applications

Boral's lower carbon special concrete products have been designed to meet specific project requirements in addition to the requirements of AS 1379. They include products that have been designed for infrastructure projects, multi-residential buildings, commercial buildings and civil works. The portland cement content in these products has been reduced to provide lower carbon options.

3) Normal class concrete products

Normal class concrete products are suitable for general applications and designed to meet the requirements of AS 1379 (Specification and supply of concrete).

4) Concrete products for special applications

Boral's special concrete products have been designed to meet specific project requirements in addition to the requirements of AS 1379. They include products that have been designed for infrastructure projects, multi-residential buildings, commercial buildings and civil works.

Humpty Doo Sewerage Pump Station, Darwin, NT



Declared products

Products covered by this Environmental Product Declaration (EPD)

The products covered in the EPD are listed below. The environmental impacts of products not referenced in the EPD can be provided on request. Boral is developing an environmental impact calculator allowing us to provide environmental profiles for virtually any mix design from any of our concrete plants in Australia. We intend to have the calculator independently verified in line with the same standards this EPD is based on, so that the results are of similar standing.

The product code for pre-mix concrete is UN CPC 375 (Articles of concrete, cement and plaster) and ANZSIC 20330 (Concrete—ready mixed—except dry mix).

1) Lower carbon concrete products

- ENVISIA® 20 MPa
- ENVISIA® 25 MPa
- ENVISIA® 32 MPa
- ENVISIA® 40 MPa
- ENVISIA® 50 MPa
- ENVISIA® 65 MPa
- ENVIROCRETE® PLUS 20 MPa
- ENVIROCRETE® PLUS 25 MPa
- ENVIROCRETE® PLUS 32 MPa
- ENVIROCRETE® PLUS 40 MPa
- ENVIROCRETE® PLUS 50 MPa
- ENVIROCRETE® 20 MPa
- ENVIROCRETE® 25 MPa
- ENVIROCRETE® 32 MPa
- ENVIROCRETE® 40 MPa
- ENVIROCRETE® 50 MPa

2) Lower carbon concrete products for special applications

- ENVIROCRETE® SPECIAL CLASS 15 MPa
- ENVIROCRETE® BLOCKFILL 20 MPa
- ENVIROCRETE® BLOCKFILL 25 MPa
- ENVIROCRETE® BLOCKFILL 32 MPa
- ENVIROCRETE® EASY PLACE 20 MPa
- ENVIROCRETE® EASY PLACE 25 MPa
- ENVIROCRETE® EASY PLACE 32 MPa
- ENVIROCRETE® EASY PLACE 40 MPa
- ENVIROCRETE® HIGH SLUMP 50 MPa
- ENVIROCRETE® HIGH SLUMP 65 MPa
- ENVIROCRETE® TREMIE 40 MPa
- ENVIROCRETE® TREMIE 50 MPa
- ENVIROCRETE® KERB MACHINE 320kg/m³
- ENVIROCRETE® GROUT 400kg/m³
- ENVIROCRETE® SHOTCRETE 32 MPa

3) Normal class concrete products

- NORMAL CLASS GP 20 MPa
- NORMAL CLASS GP 25 MPa
- NORMAL CLASS GP 32 MPa
- NORMAL CLASS GP 40 MPa
- NORMAL CLASS GP 50 MPa

4) Concrete products for special applications

- SPECIAL CLASS GP 15 MPa
- BLOCKFILL 20 MPa
- BLOCKFILL 25 MPa
- BLOCKFILL 32 MPa
- EASY PLACE 20 MPa
- EASY PLACE 25 MPa
- EASY PLACE 32 MPa
- EASY PLACE 40 MPa
- HIGH SLUMP 50 MPa
- HIGH SLUMP 65 MPa
- TREMIE 40 MPa
- TREMIE 50 MPa
- KERB MACHINE 320kg/m³
- GROUT 400kg/m³
- SHOTCRETE 32 MPa
- POST TENSIONED 40 MPa 22@3
- POST TENSIONED 40 MPa 22@4
- POST TENSIONED 40 MPa 22@5
- SPECIAL CLASS LOW HEAT S50
- SPECIAL CLASS LOW HEAT S55
- SPECIAL CLASS LOW HEAT S65
- STABILISED SAND 3%
- STABILISED SAND 5%
- STABILISED SAND 7%
- STABILISED SAND 10%
- STABILISED SAND 20%
- NO FINES 6:1

Pre-mix concrete production

Concrete production is the process of combining water, aggregates, cementitious binders and additives. These different 'ingredients' are mixed at a specialised facility known as a 'batching' plant.

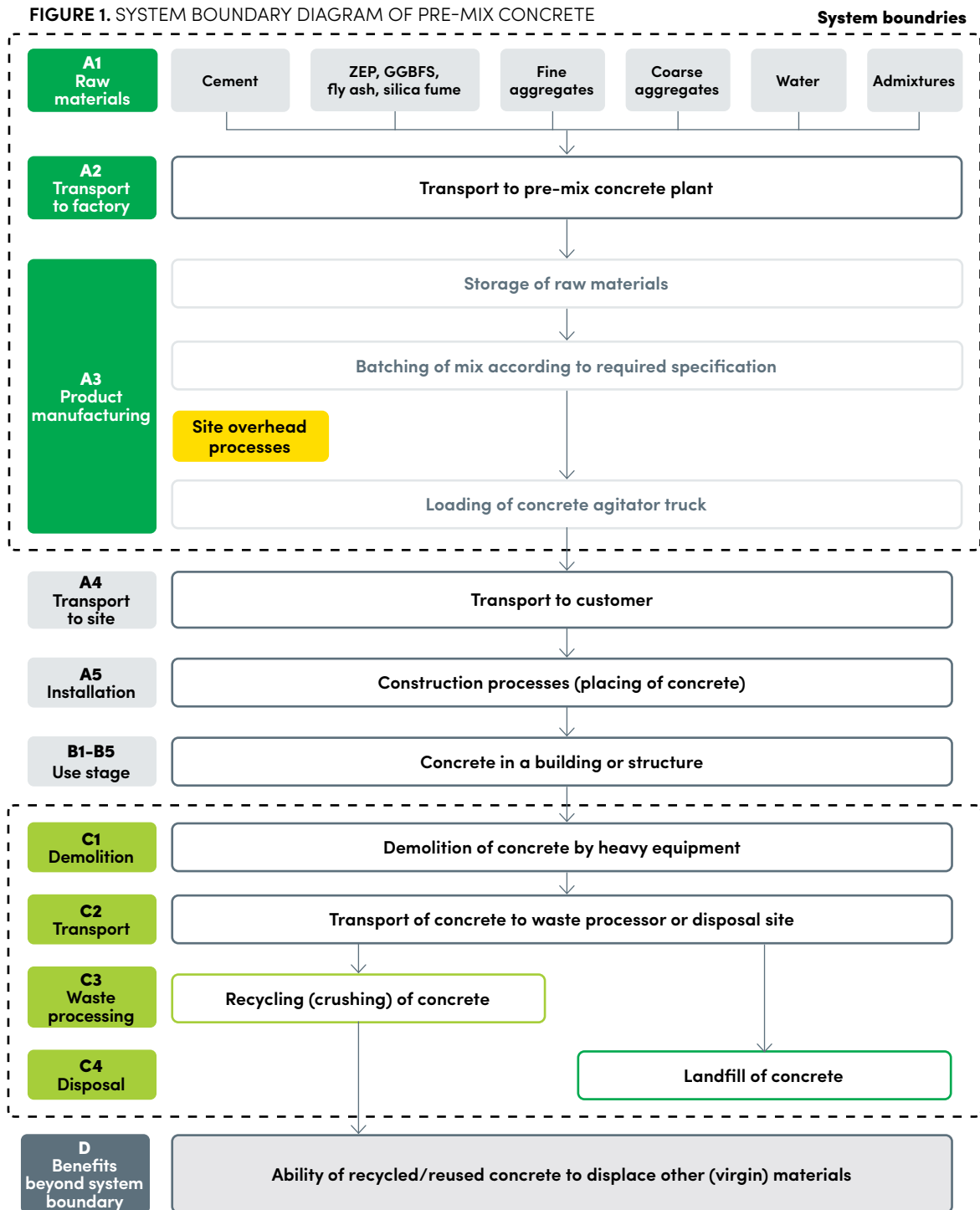
The batching plant stores the ingredients in cement silos, aggregate bins and admixture tanks and uses calibrated weigh scales and flow meters to accurately weigh the ingredients. The ingredients are then mixed in a transit mixer compliant with item C3 of AS 1379 to produce concrete which is delivered to the project.

Depending on the proposed application of the final product, the concrete may contain other ingredients such as colour oxides and fibres and the production process may include heaters or chillers. Concrete production is time-sensitive, once the ingredients are mixed, workers must put the concrete in place before it loses workability.



Life cycle stages covered by the Life Cycle Assessment (LCA)

This EPD covers the cradle-to-gate life cycle stages with modules C and D (A1-A3, C1-C4, D), as per the diagram below. Modules A4-A5 and B1-B7 have not been included, as these are best modelled at the building or infrastructure project level.



Life cycle stages covered by the Life Cycle Assessment (LCA)

Raw material stage (A1)

All raw materials used in the production of Boral's normal class concrete, lower carbon concrete and special concrete products comply with the following standards as required by AS 3600 Concrete Structures (SA 2018) and AS 1379 Specification and Supply of Concrete (SA 2007/R2017):

- **AS 3972:** General purpose and blended cements
- **AS 3582.1** Supplementary cementitious materials Part 1: Fly Ash
- **AS 3582.2** Supplementary cementitious materials Part 2: Slag—Ground granulated blast furnace
- **AS 2758.1** Aggregates and rock for engineering purposes Part 1: Concrete Aggregates
- **AS 1478.1** Chemical admixtures for concrete, mortar and grout

Transportation stage (A2)

Raw materials are typically transported to our sites via rigid trucks. Coarse aggregates, manufactured sands and natural sands are sourced from our network of quarries, as well as third-party quarries. General Purpose Cement (GP) and Ground Granulated Blast Furnace Slag (GGBFS) are the two main cementitious materials used in the Northern Territory market. They are supplied by local suppliers in the Northern Territory using imported ingredients and delivered to our sites in rigid trucks.

ZEP® additive is transported by articulated truck from Sydney; other admixtures are sourced from locally based suppliers and transported using rigid trucks.



Life cycle stages covered by the Life Cycle Assessment (LCA)

TABLE 1. SCOPE OF EPD

	Product stage			Construction stage		Use stage							End-of-life stage				Benefits beyond system boundary
	RAW MATERIAL SUPPLY	TRANSPORT	MANUFACTURING	TRANSPORT	CONSTRUCTION-INSTALLATION PROCESS	USE	MAINTENANCE	REPAIR	REPLACEMENT	REFURBISHMENT	OPERATIONAL ENERGY USE	OPERATIONAL WATER USE	DECONSTRUCTION DEMOLITION	TRANSPORT	WASTE PROCESSING	DISPOSAL	REUSE, RECOVERY, RECYCLING POTENTIAL
Modules	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	✓	✓	✓	ND	ND	ND	ND	ND	ND	ND	ND	ND	✓	✓	✓	✓	✓
Geography	AU, JP/CN	AU	AU										AU	AU	AU	AU	AU
Specific data used	10-45%																
Variation—Products	Not relevant																
Variation—Sites	Not relevant																

✓ = module is included in this study ND = module is not declared*

* When a module is not accounted for, the stage is marked with "ND" (Not Declared).
ND is used when we cannot define a typical scenario.

Life cycle stages covered by the Life Cycle Assessment (LCA)

Manufacturing stage (A3)

The manufacturing process of Boral’s normal class concrete, lower carbon concrete and special concrete products is by mixing concrete constituents comprising of cement and supplementary cementitious materials (SCM) (AS 3972/AS 3582.1,2), and fine/coarse aggregates (AS 2758.1), plus admixtures/additives (AS 1478.1) and water (AS 1379) directly in the truck referred to as the dry batch method, or in selected locations pre-mixing in a wet mix fashion, before delivery by agitator truck.

The entire process is covered under AS 1379 Specification and Supply of concrete and verified by third party under ISO9001. This manufacturing stage (A3) includes activities associated with sourcing and delivery of individual concrete constituents, up to the point of mixing at the batch plant, but not including delivery and placement of concrete at the project location. This is typically described as the Cradle (A1) to Gate (A3) life cycle.

End-of-life (C1-C4)

The end-of-life modules for pre-mix concrete are based on generic scenarios.

Module C1 covers demolition of the concrete at the end of its service life. For concrete produced in Darwin, we have used the end-of-life scenario representative for NT masonry products based on the *National Waste Report 2020* (NWR 2020). This scenario implies that 11% of the concrete is recycled and the remaining 89% of the concrete is sent to landfill.

Module C2 comprises the transport from the demolition site to a recycling centre or landfill site (50km). Module C3 encompasses the recycling process (i.e. crushing of concrete), while Module C4 represents disposal of concrete in a landfill site.

The concrete reaches end-of-waste status when it is crushed and stockpiled as “recycled crushed concrete” (RCC) aggregates.

We have modeled a single scenario for a concrete with a density of 2,350kg/m³. This is the (unweighted) average of the concrete mixes covered by the EPD. The impact of this simplification is much smaller than the impact of the scenario and data assumptions applied to the end-of-life modules.

TABLE 2: END-OF-LIFE SCENARIO PARAMETERS

Processes	Quantity per m ³ of concrete	Unit
Collection process specified by type	2,350	kg collected separately
	0	kg collected with mixed construction waste
Transport from demolition site to recovery/disposal sites	50	km transport
Recovery system specified by type	0	kg for re-use
	260	kg for recycling
	0	kg for energy recovery
Disposal to landfill	2,090	kg product or material for final deposition
Assumptions for scenario development	145	MJ of diesel for the demolition process

Life cycle stages covered by the Life Cycle Assessment (LCA)

The scenarios included are currently in use and are representative for one of the most probable alternatives. Due to high uncertainty in the parameters and lack of data, CO₂-uptake (carbonation) has not been included at end-of-life.

Loads and benefits beyond the system boundaries (D)

Module D includes any benefits and loads from net flows leaving the product system (that have passed the end-of-waste state). For this EPD, any material collected for recycling and processed in Module C3, is considered to go through to Module D. We have assumed that Recycled Crushed Concrete aggregates replace virgin aggregates (crushed rocks).



Life Cycle Assessment (LCA) methodology

Background data

Boral has supplied primary data from our Mount Bundey quarry, and Winnellie (Darwin) concrete production site. Where aggregates are sourced from other quarries, we use the unweighted average for those materials across all the Boral quarries that have provided data nationally. Background data (e.g. for energy and transport processes, cement and blast furnace slag) have predominantly been sourced from AusLCI and the AusLCI shadow database (v1.36).

Data for admixtures are based on generic ecoinvent data for organic and inorganic chemicals. The quarry data and concrete production data have been collected for calendar year 2018. The concrete mix designs are based on 2022 composition data. The vast majority of the environmental profiles of our products are based on life cycle data that are less than five years old. Background data used is less than 10 years old.

Methodological choices have been applied in line with EN 15804+A2; deviations have been recorded.

Allocation

The key material production processes that require allocation are:

Pre-mix concrete

Boral manufactures a range of pre-mix concrete products at its sites. Energy use for concrete production has been allocated to the products based on a volume basis (total m³ of pre-mix concrete products).

Aggregates

Aggregates are produced through crushing of rock, which is graded in different sizes. The energy required for the crushing and screening does not differentiate between products. Therefore, aggregate production (including manufactured sand) has been allocated based on the mass of product.

Silica fume (micro-silica)

Silica fume (micro-silica) is a by-product of silicon metal or ferrosilicon alloys production. We used economic allocation to assign impacts of silicon production to silicon and silica fume.

Blast Furnace Slag (BFS)

BFS is a by-product from steel-making. We have used the AusLCI data for BFS ('Blast Furnace Slag allocation, at steel plant/AU U'), which contain impacts from pig iron production allocated to blast furnace slag using economic allocation.



Life Cycle Assessment (LCA) methodology

Cut-off criteria

The contribution of capital goods (production equipment and infrastructure) and personnel is excluded, as these processes are non-attributable and they contribute less than 10% to GWP-GHG.

The amount of packaging used for admixtures is well below the materiality cut-off and these materials have been excluded.

Key assumptions

Admixture data

Are based on generic AusLCI data for organic and inorganic chemicals.

Water consumption

Is not measured consistently across quarries. We have used AusLCI water consumption data per tonne of coarse and fine aggregates instead.

Blast Furnace Slag (BFS)

Receives some environmental impacts from pig iron production. This allocation decision has an effect on the environmental profile of products that use Ground-Granulated Blast Furnace Slag (GGBFS).

Cement data

Are based on generic AusLCI data for cement produced from imported clinker.

Electricity

Has been modelled for core processes using the AusLCI data for the electricity mix used in the Northern Territory. The GWP-GHG of the electricity is 0.69 kg CO₂e/kWh.



Product composition

Content declaration (% by weight)

TABLE 3. NT PRODUCT COMPOSITIONS

Constituent (% by weight)	ENVISIA®*	ENVIROCRETE® PLUS*	ENVIROCRETE®	Post- consumer material, weight %	Renewable material, weight %
Density	2,330– 2,380 kg/m ³	2,360– 2,380 kg/m ³	2,330– 2,380 kg/m ³		
General purpose cement	6-11%	7-13%	8-13%	0%	0%
Ground granulated blast furnace slag	4-13%	3-9%	3-9%	0%	0%
Silica fume	-	-	-	0%	0%
Coarse aggregate	40-45%	40-45%	40-45%	0%	0%
Manufactured sand	15-25%	15-25%	15-25%	0%	0%
Natural sand	5-20%	10-20%	10-20%	0%	0%
Admixtures	<0.7%	<0.3%	<0.2%	0%	0%
Water	7%	7%	7%	0%	0%

Constituent (% by weight)	ENVIROCRETE FOR SPECIAL APPLICATIONS	NORMAL CLASS GP BLEND	SPECIAL APPLICATIONS	Post- consumer material, weight %	Renewable material, weight %
Density	2,220– 2,400 kg/m ³	2,330– 2,400 kg/m ³	1,870– 2,390 kg/m ³		
General purpose cement	7-15%	10-22%	3-23%	0%	0%
Ground granulated blast furnace slag	3-11%	-	0-14%	0%	0%
Silica fume	0-1%	-	0-1%	0%	0%
Coarse aggregate	0-50%	40-45%	0-85%	0%	0%
Manufactured sand	10-30%	15-20%	0-55%	0%	0%
Natural sand	5-45%	10-25%	0-45%	0%	0%
Admixtures	<0.3%	<0.2%	<0.3%	0%	0%
Water	7-11%	7%	6-11%	0%	0%

*May include Zep® technology.

The products as supplied are non-hazardous. The products included in this EPD do not contain any substances of very high concern as defined by European REACH regulation in concentrations >0.1% (m/m).

Pre-mix concrete is supplied in bulk; packaging materials are not relevant for the products contained in this EPD.

Boral's pre-mix concrete does not contain any biogenic carbon.

Declared unit

The background LCA serves as the foundation for this EPD. An LCA analyses the environmental processes in the value chain of a product. It provides a comprehensive evaluation of all upstream (and some downstream) material and energy inputs and outputs. The results are provided for a range of environmental impact categories, in line with EN 15804+A2.

Pre-mix concrete is available in various strength grades and with characteristics that are specifically designed for each application. The declared unit that covers all of the products is: **One cubic metre (m³) of pre-mix concrete (as ordered by client) with a given strength grade and identifying characteristics.** This declared unit has been adapted from the C-PCR (EN 16757).

All results are presented per declared unit.



Environmental indicators

TABLE 4. EN 15804+A2 CORE IMPACT CATEGORIES INCLUDED IN THIS ASSESSMENT

Impact category	Acronym	Unit
Global warming potential—Total	GWP-total	kg CO ₂ equivalents
Global warming potential—Fossil	GWP-fossil	kg CO ₂ equivalents
Global warming potential—Biogenic	GWP-biogenic	kg CO ₂ equivalents
Global warming potential—Land use and land use change	GWP-luluc	kg CO ₂ equivalents
Depletion potential of the stratospheric ozone layer	ODP	kg CFC-11 equivalents
Acidification potential and accumulated exceedance	AP	mol H ⁺ equivalents
Eutrophication potential and aquatic freshwater	EP-freshwater	kg P equivalents
Eutrophication potential and aquatic marine	EP-marine	kg N equivalents
Eutrophication potential and terrestrial	EP-terrestrial	mol N equivalents
Photochemical ozone formation potential	POCP	kg NMVOC equivalents
Abiotic depletion potential for non-fossil resources*	ADP-minerals and metals	kg Sb equivalents
Abiotic depletion potential for fossil resources*	ADP-fossils	MJ
Water (user) deprivation potential*	WDP	m ³ world equivalent deprived

TABLE 5. EN 15804+A2 ADDITIONAL IMPACT CATEGORIES INCLUDED IN THIS ASSESSMENT

Impact category	Acronym	Unit
Global warming potential—climate impact [#]	GWP-GHG	kg CO ₂ equivalents
Particulate matter emissions	PM	Disease incidence
Ionizing radiation and human health**	IRP	kBq U235 equivalents
Eco-toxicity—Freshwater*	ETP-fw	CTUe
Human toxicity potential and cancer*	HTP-c	CTUh
Human toxicity potential and non-cancer*	HTP-nc	CTUh
Land use related impacts/Soil quality*	SQP	-

* The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

** This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

[#] The GWP-GHG indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product as defined by IPCC AR 5 (IPCC 2013). This indicator is determined using the IPCC AR5 Global Warming Potentials (GWP) with a 100-year time horizon.

Environmental indicators

TABLE 6. PARAMETERS DESCRIBING RESOURCE USE, WASTE AND OUTPUT FLOWS

Resource use	Acronym	Unit
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	MJ _{NCV}
Use of renewable primary energy resources used as raw materials	PERM	MJ _{NCV}
Total use of renewable primary energy resources	PERT	MJ _{NCV}
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE	MJ _{NCV}
Use of non-renewable primary energy resources used as raw materials	PENRM	MJ _{NCV}
Total use of non-renewable primary energy resources	PENRT	MJ _{NCV}
Use of secondary material	SM	kg
Use of renewable secondary fuels	RSF	MJ _{NCV}
Use of non-renewable secondary fuels	NRSF	MJ _{NCV}
Use of net fresh water	FW	m ³
Waste categories		
Hazardous waste disposed	HWD	kg
Non-hazardous waste disposed	NHWD	kg
Radioactive waste disposed	RWD	kg
Output flows		
Components for re-use	CRU	kg
Materials for recycling	MFR	kg
Materials for energy recovery	MER	kg
Exported energy	EE	MJ

TABLE 6. EN 15804+A1 IMPACT CATEGORIES INCLUDED IN THIS ASSESSMENT

Impact category	Acronym	Unit
Global Warming Potential	GWP	kg CO ₂ equivalents
Ozone Depletion Potential	ODP	kg CFC-11 equivalents
Acidification Potential of Soil and Water	AP	kg SO ₂ equivalents
Eutrophication Potential	EP	kg PO ₄ ³⁻ equivalents
Photochemical Ozone Creation Potential	POCP	kg C ₂ H ₄ equivalents
Abiotic Depletion Potential for Mineral Elements	ADPE	kg Sb equivalents
Abiotic Depletion Potential for Fossil Fuels	ADPF	MJ

Environmental profiles

The cradle-to-gate (module A1-A3) environmental profiles and environmental parameters of each product group are expressed per m³ of pre-mix concrete (volume as ordered by the client).

Limitations

The results of this study and the EPD are valid for Boral products only. Products from other manufacturers will likely have different impacts due to differences in mix designs, supply chains and manufacturing processes. The main limitations of the LCA results are found in the parameter results, which are highly dependent on background data.

Variation (A1-A3) per impact category

The results of the LCA are based on data from one location, Winnellie. Hence there is no variation in the results due to the averaging between sites.





Darwin region

Environmental profiles and parameters

Product table list

Darwin region

In each region, we start with presenting a summary of the cradle-to-gate carbon footprint (GWP summary) of our concrete mixes. The end of life impacts of all concrete products are given in tables M1 to M4.

Lower carbon concrete products

Table No. A1, A2, A3 and A4 28

- ENVISIA® 20 MPa
- ENVISIA® 25 MPa
- ENVISIA® 32 MPa
- ENVISIA® 40 MPa
- ENVISIA® 50 MPa
- ENVISIA® 65 MPa

Table No. B1, B2, B3 and B4 30

- ENVIROCRETE® PLUS 20 MPa
- ENVIROCRETE® PLUS 25 MPa
- ENVIROCRETE® PLUS 32 MPa
- ENVIROCRETE® PLUS 40 MPa
- ENVIROCRETE® PLUS 50 MPa

Table No. C1, C2, C3 and C4 32

- ENVIROCRETE® 20 MPa
- ENVIROCRETE® 25 MPa
- ENVIROCRETE® 32 MPa
- ENVIROCRETE® 40 MPa
- ENVIROCRETE® 50 MPa

Lower carbon concrete

products for special applications

Table No. D1, D2, D3 and D4 34

- ENVIROCRETE® SPECIAL CLASS 15 MPa
- ENVIROCRETE® BLOCKFILL 20 MPa
- ENVIROCRETE® BLOCKFILL 25 MPa
- ENVIROCRETE® BLOCKFILL 32 MPa

Table No. E1, E2, E3 and E4 36

- ENVIROCRETE® EASY PLACE 20 MPa
- ENVIROCRETE® EASY PLACE 25 MPa
- ENVIROCRETE® EASY PLACE 32 MPa
- ENVIROCRETE® EASY PLACE 40 MPa
- ENVIROCRETE® HIGH SLUMP 50 MPa
- ENVIROCRETE® HIGH SLUMP 65 MPa

Table F1, F2, F3 and F4 38

- ENVIROCRETE® TREMIE 40 MPa
- ENVIROCRETE® TREMIE 50 MPa
- ENVIROCRETE® KERB MACHINE 320kg/m³
- ENVIROCRETE® GROUT 400kg/m³
- ENVIROCRETE® SHOTCRETE 32 MPa

Normal class concrete products

Table No G1, G2, G3 and G4 40

- NORMAL CLASS GP 20 MPa
- NORMAL CLASS GP 25 MPa
- NORMAL CLASS GP 32 MPa
- NORMAL CLASS GP 40 MPa
- NORMAL CLASS GP 50 MPa

Concrete products for special applications

Table No. H1, H2, H3 and H4 42

- SPECIAL CLASS GP 15 MPa
- BLOCKFILL 20 MPa
- BLOCKFILL 25 MPa
- BLOCKFILL 32 MPa

Table No. I1, I2, I3 and I4 44

- EASY PLACE 20 MPa
- EASY PLACE 25 MPa
- EASY PLACE 32 MPa
- EASY PLACE 40 MPa
- HIGH SLUMP 50 MPa
- HIGH SLUMP 65 MPa

Table No. J1, J2, J3 and J4 46

- TREMIE 40 MPa
- TREMIE 50 MPa
- KERB MACHINE 320kg/m³
- GROUT 400kg/m³
- SHOTCRETE 32 MPa

Table K1, K2, K3 and K4 48

- POST TENSIONED 40 MPa 22@3
- POST TENSIONED 40 MPa 22@4
- POST TENSIONED 40 MPa 22@5
- SPECIAL CLASS LOW HEAT S50
- SPECIAL CLASS LOW HEAT S55
- SPECIAL CLASS LOW HEAT S65

Table No L1, L2, L3 and L4 50

- STABILISED SAND 3%
- STABILISED SAND 5%
- STABILISED SAND 7%
- STABILISED SAND 10%
- STABILISED SAND 20%
- NO FINES 6:1

Cradle-to-gate GWP-GHG summary (kg CO₂ eq/m³)

Darwin region

ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa	ENVISIA® 65 MPa
226	243	273	319	406	415
ENVIROCRETE® PLUS 20 MPa	ENVIROCRETE® PLUS 25 MPa	ENVIROCRETE® PLUS 32 MPa	ENVIROCRETE® PLUS 40 MPa	ENVIROCRETE® PLUS 50 MPa	
248	267	300	351	445	
ENVIROCRETE® 20 MPa	ENVIROCRETE® 25 MPa	ENVIROCRETE® 32 MPa	ENVIROCRETE® 40 MPa	ENVIROCRETE® 50 MPa	
257	277	312	372	436	
ENVIROCRETE® SPECIAL CLASS GP 15 MPa	ENVIROCRETE® BLOCKFILL 20 MPa	ENVIROCRETE® BLOCKFILL 25 MPa	ENVIROCRETE® BLOCKFILL 32 MPa		
238	264	282	317		
ENVIROCRETE® EASY PLACE 20 MPa	ENVIROCRETE® EASY PLACE 25 MPa	ENVIROCRETE® EASY PLACE 32 MPa	ENVIROCRETE® EASY PLACE 40 MPa	ENVIROCRETE® HIGH SLUMP 50 MPa	ENVIROCRETE® HIGH SLUMP 65 MPa
260	279	311	372	466	471
ENVIROCRETE® TREMIE 40 MPa	ENVIROCRETE® TREMIE 50 MPa	ENVIROCRETE® KERB MACHINE 320kg / m ³	ENVIROCRETE® GROUT 400kg / m ³	ENVIROCRETE® SHOTCRETE 32 MPa	
379	470	314	262	357	
NORMAL GP BLEND 20 MPa	NORMAL GP BLEND 25 MPa	NORMAL GP BLEND 32 MPa	NORMAL GP BLEND 40 MPa	NORMAL GP BLEND 50 MPa	
293	315	357	428	617	
SPECIAL CLASS GP 15 MPa	BLOCKFILL 20 MPa	BLOCKFILL 25 MPa	BLOCKFILL 32 MPa		
271	342	362	434		
EASY PLACE 20 MPa	EASY PLACE 25 MPa	EASY PLACE 32 MPa	EASY PLACE 40 MPa	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa
321	337	369	443	623	635
TREMIE 40 MPa	TREMIE 50 MPa	KERB MACHINE 320kg / m ³	GROUT 400kg / m ³	SHOTCRETE 32 MPa	
526	611	392	470	406	
POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	POST TENSIONED 40 MPa 22@5	SPECIAL CLASS LOW HEAT S50	SPECIAL CLASS LOW HEAT S55	SPECIAL CLASS LOW HEAT S65
470	460	438	304	304	319
STABILISED SAND 3%	STABILISED SAND 5%	STABILISED SAND 7%	STABILISED SAND 10%	STABILISED SAND 20%	NO FINES 6:1
109	131	179	236	418	286

Darwin region

TABLE A1. EN 15804+A2 IMPACT CATEGORIES (A1-A3), ENVISIA® CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa	ENVISIA® 65 MPa
GWP—Total	kg CO₂ eq.	229	246	276	323	411	420
GWP—Fossil	kg CO ₂ eq.	229	246	276	323	410	420
GWP—Biogenic	kg CO ₂ eq.	1.34E-01	1.38E-01	1.47E-01	1.61E-01	2.06E-01	2.17E-01
GWP—Luluc	kg CO ₂ eq.	6.15E-04	6.74E-04	7.60E-04	9.19E-04	1.21E-03	1.26E-03
ODP	kg CFC11 eq.	1.04E-05	1.07E-05	1.14E-05	1.22E-05	1.51E-05	1.57E-05
AP	mol H+ eq.	1.53E+00	1.63E+00	1.81E+00	2.11E+00	2.82E+00	2.94E+00
EP—Freshwater	kg P eq.	3.05E-04	3.34E-04	3.80E-04	4.57E-04	5.81E-04	5.91E-04
EP—Marine	kg N eq.	4.15E-01	4.41E-01	4.89E-01	5.61E-01	7.22E-01	7.45E-01
EP—Terrestrial	mol N eq.	4.62E+00	4.91E+00	5.45E+00	6.26E+00	8.07E+00	8.32E+00
POCP	kg NMVOC eq.	1.12E+00	1.19E+00	1.32E+00	1.52E+00	1.96E+00	2.02E+00
ADP—Minerals and Metals	kg Sb eq.	1.75E-06	1.86E-06	2.01E-06	2.32E-06	3.08E-06	3.29E-06
ADP—Fossil	MJ (NCV)	2.07E+03	2.18E+03	2.39E+03	2.72E+03	3.50E+03	3.63E+03
WDP	m ³ eq.	1.81E+03	1.97E+03	2.24E+03	2.68E+03	3.49E+03	3.58E+03

TABLE A2. EN 15804+A2 ADDITIONAL IMPACT CATEGORIES (A1-A3), ENVISIA® CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa	ENVISIA® 65 MPa
PM	Disease incidence	9.05E-06	9.41E-06	1.01E-05	1.11E-05	1.34E-05	1.37E-05
IRP	kBq U235 eq.	8.12E-01	9.01E-01	1.04E+00	1.27E+00	1.60E+00	1.60E+00
ETP-fw	CTUe	9.03E+02	9.76E+02	1.10E+03	1.30E+03	1.66E+03	1.69E+03
HTP-c	CTUh	1.78E-08	1.93E-08	2.18E-08	2.61E-08	3.44E-08	3.55E-08
HTP-nc	CTUh	9.57E-07	1.04E-06	1.18E-06	1.42E-06	1.88E-06	1.93E-06
SQP	-	1.72E+02	1.76E+02	1.84E+02	1.97E+02	2.34E+02	2.42E+02
Carbon footprint (IPCC AR5, 100yr)							
GWP-GHG	kg CO₂ eq.	226	243	273	319	406	415

Refer to "Environmental Indicators" p.22-23 for full description of indicators, units and abbreviations.

Darwin region

TABLE A3. ENVIRONMENTAL PARAMETERS (A1-A3), ENVISIA® CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa	ENVISIA® 65 MPa
PERE	MJ _{NCV}	2.18E+01	2.32E+01	2.57E+01	2.99E+01	4.06E+01	4.27E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	2.18E+01	2.32E+01	2.57E+01	2.99E+01	4.06E+01	4.27E+01
PENRE	MJ _{NCV}	2.13E+03	2.25E+03	2.46E+03	2.79E+03	3.59E+03	3.73E+03
PENRM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ _{NCV}	2.13E+03	2.25E+03	2.46E+03	2.79E+03	3.59E+03	3.73E+03
SM	kg	1.09E+02	1.14E+02	1.31E+02	1.58E+02	2.90E+02	3.27E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	4.26E+00	4.29E+00	4.38E+00	4.47E+00	4.56E+00	4.57E+00
HWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	9.13E-02	9.72E-02	1.10E-01	1.31E-01	1.97E-01	2.12E-01
RWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content—Product		N/A	N/A	N/A	N/A	N/A	N/A
Biogenic carbon content—Packaging		N/A	N/A	N/A	N/A	N/A	N/A

TABLE A4. EN 15804+A1 IMPACT CATEGORIES (A1-A3), ENVISIA® CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	ENVISIA® 20 MPa	ENVISIA® 25 MPa	ENVISIA® 32 MPa	ENVISIA® 40 MPa	ENVISIA® 50 MPa	ENVISIA® 65 MPa
GWP	kg CO ₂ eq.	225	243	272	318	405	414
ODP	kg CFC11 eq.	8.22E-06	8.48E-06	9.02E-06	9.68E-06	1.20E-05	1.24E-05
AP	kg SO ₂ eq.	1.06E+00	1.13E+00	1.27E+00	1.49E+00	2.01E+00	2.10E+00
EP	kg PO ₄ ³⁻ eq.	1.45E-01	1.54E-01	1.70E-01	1.96E-01	2.52E-01	2.60E-01
POCP	kg C ₂ H ₄ eq.	8.29E-02	8.64E-02	9.32E-02	1.03E-01	1.30E-01	1.35E-01
ADPE	kg Sb eq.	4.45E-06	4.81E-06	5.29E-06	6.28E-06	8.75E-06	9.52E-06
ADPF	MJ _{NCV}	2.04E+03	2.16E+03	2.37E+03	2.69E+03	3.47E+03	3.60E+03

Refer to "Environmental Indicators" p.22-23 for full description of indicators, units and abbreviations.

Darwin region

TABLE B1. EN 15804+A2 IMPACT CATEGORIES (A1-A3), ENVIROCRETE® PLUS CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	ENVIROCRETE® PLUS 20 MPa	ENVIROCRETE® PLUS 25 MPa	ENVIROCRETE® PLUS 32 MPa	ENVIROCRETE® PLUS 40 MPa	ENVIROCRETE® PLUS 50 MPa
GWP—Total	kg CO₂ eq.	251	270	303	355	449
GWP—Fossil	kg CO ₂ eq.	250	269	303	355	449
GWP—Biogenic	kg CO ₂ eq.	1.29E-01	1.33E-01	1.41E-01	1.54E-01	1.95E-01
GWP—Luluc	kg CO ₂ eq.	6.85E-04	7.49E-04	8.44E-04	1.02E-03	1.35E-03
ODP	kg CFC11 eq.	1.03E-05	1.06E-05	1.12E-05	1.20E-05	1.47E-05
AP	mol H+ eq.	1.58E+00	1.68E+00	1.88E+00	2.18E+00	2.90E+00
EP—Freshwater	kg P eq.	3.49E-04	3.82E-04	4.35E-04	5.24E-04	6.66E-04
EP—Marine	kg N eq.	4.38E-01	4.65E-01	5.16E-01	5.93E-01	7.60E-01
EP—Terrestrial	mol N eq.	4.88E+00	5.19E+00	5.76E+00	6.63E+00	8.50E+00
POCP	kg NMVOC eq.	1.18E+00	1.25E+00	1.39E+00	1.60E+00	2.06E+00
ADP—Minerals and Metals	kg Sb eq.	1.79E-06	1.90E-06	2.05E-06	2.37E-06	3.19E-06
ADP—Fossil	MJ (NCV)	2.13E+03	2.25E+03	2.47E+03	2.81E+03	3.60E+03
WDP	m ³ eq.	2.00E+03	2.17E+03	2.47E+03	2.96E+03	3.83E+03

TABLE B2. EN 15804+A2 ADDITIONAL IMPACT CATEGORIES (A1-A3), ENVIROCRETE® PLUS CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	ENVIROCRETE® PLUS 20 MPa	ENVIROCRETE® PLUS 25 MPa	ENVIROCRETE® PLUS 32 MPa	ENVIROCRETE® PLUS 40 MPa	ENVIROCRETE® PLUS 50 MPa
PM	Disease incidence	9.28E-06	9.66E-06	1.03E-05	1.13E-05	1.36E-05
IRP	kBq U235 eq.	9.73E-01	1.07E+00	1.24E+00	1.52E+00	1.90E+00
ETP-fw	CTUe	9.99E+02	1.08E+03	1.22E+03	1.44E+03	1.83E+03
HTP-c	CTUh	1.94E-08	2.10E-08	2.39E-08	2.85E-08	3.75E-08
HTP-nc	CTUh	1.05E-06	1.14E-06	1.30E-06	1.56E-06	2.06E-06
SQP	-	1.70E+02	1.75E+02	1.82E+02	1.95E+02	2.29E+02
Carbon footprint (IPCC AR5, 100yr)						
GWP-GHG	kg CO₂ eq.	248	267	300	351	445

Refer to "Environmental Indicators" p.22-23 for full description of indicators, units and abbreviations.

Darwin region

TABLE B3. ENVIRONMENTAL PARAMETERS (A1-A3), ENVIROCRETE® PLUS CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	ENVIROCRETE® PLUS 20 MPa	ENVIROCRETE® PLUS 25 MPa	ENVIROCRETE® PLUS 32 MPa	ENVIROCRETE® PLUS 40 MPa	ENVIROCRETE® PLUS 50 MPa
PERE	MJ _{NCV}	2.17E+01	2.30E+01	2.55E+01	2.96E+01	3.98E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	2.17E+01	2.30E+01	2.55E+01	2.96E+01	3.98E+01
PENRE	MJ _{NCV}	2.19E+03	2.32E+03	2.54E+03	2.88E+03	3.69E+03
PENRM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ _{NCV}	2.19E+03	2.32E+03	2.54E+03	2.88E+03	3.69E+03
SM	kg	8.01E+01	8.32E+01	9.46E+01	1.14E+02	2.35E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	4.35E+00	4.39E+00	4.44E+00	4.54E+00	4.64E+00
HWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	8.30E-02	8.84E-02	9.91E-02	1.18E-01	1.77E-01
RWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content—Product		N/A	N/A	N/A	N/A	N/A
Biogenic carbon content—Packaging		N/A	N/A	N/A	N/A	N/A

TABLE B4. EN 15804+A1 IMPACT CATEGORIES (A1-A3), ENVIROCRETE® PLUS CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	ENVIROCRETE® PLUS 20 MPa	ENVIROCRETE® PLUS 25 MPa	ENVIROCRETE® PLUS 32 MPa	ENVIROCRETE® PLUS 40 MPa	ENVIROCRETE® PLUS 50 MPa
GWP	kg CO ₂ eq.	247	266	299	350	443
ODP	kg CFC11 eq.	8.14E-06	8.40E-06	8.88E-06	9.51E-06	1.16E-05
AP	kg SO ₂ eq.	1.10E+00	1.18E+00	1.33E+00	1.55E+00	2.08E+00
EP	kg PO ₄ ³⁻ eq.	1.53E-01	1.62E-01	1.80E-01	2.07E-01	2.65E-01
POCP	kg C ₂ H ₄ eq.	8.33E-02	8.69E-02	9.35E-02	1.03E-01	1.29E-01
ADPE	kg Sb eq.	4.47E-06	4.83E-06	5.30E-06	6.31E-06	8.80E-06
ADPF	MJ _{NCV}	2.11E+03	2.23E+03	2.45E+03	2.79E+03	3.56E+03

Refer to "Environmental Indicators" p.22-23 for full description of indicators, units and abbreviations.

Darwin region

TABLE C1. EN 15804+A2 IMPACT CATEGORIES (A1-A3), ENVIROCRETE® CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	ENVIROCRETE® 20 MPa	ENVIROCRETE® 25 MPa	ENVIROCRETE® 32 MPa	ENVIROCRETE® 40 MPa	ENVIROCRETE® 50 MPa
GWP—Total	kg CO₂ eq.	260	280	315	376	440
GWP—Fossil	kg CO ₂ eq.	260	280	315	376	440
GWP—Biogenic	kg CO ₂ eq.	1.24E-01	1.28E-01	1.34E-01	1.52E-01	1.82E-01
GWP—Luluc	kg CO ₂ eq.	6.66E-04	7.33E-04	8.26E-04	1.08E-03	1.24E-03
ODP	kg CFC11 eq.	9.98E-06	1.01E-05	1.09E-05	1.22E-05	1.40E-05
AP	mol H+ eq.	1.59E+00	1.69E+00	1.89E+00	2.24E+00	2.81E+00
EP—Freshwater	kg P eq.	3.65E-04	4.00E-04	4.56E-04	5.63E-04	6.46E-04
EP—Marine	kg N eq.	4.46E-01	4.72E-01	5.27E-01	6.18E-01	7.41E-01
EP—Terrestrial	mol N eq.	4.97E+00	5.27E+00	5.89E+00	6.91E+00	8.30E+00
POCP	kg NMVOC eq.	1.20E+00	1.27E+00	1.42E+00	1.66E+00	2.01E+00
ADP—Minerals and Metals	kg Sb eq.	1.58E-06	1.68E-06	1.82E-06	2.42E-06	2.78E-06
ADP—Fossil	MJ (NCV)	2.13E+03	2.24E+03	2.48E+03	2.89E+03	3.46E+03
WDP	m ³ eq.	2.08E+03	2.27E+03	2.58E+03	3.13E+03	3.72E+03

TABLE C2. EN 15804+A2 ADDITIONAL IMPACT CATEGORIES (A1-A3), ENVIROCRETE® CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	ENVIROCRETE® 20 MPa	ENVIROCRETE® 25 MPa	ENVIROCRETE® 32 MPa	ENVIROCRETE® 40 MPa	ENVIROCRETE® 50 MPa
PM	Disease incidence	9.25E-06	9.57E-06	1.03E-05	1.17E-05	1.32E-05
IRP	kBq U235 eq.	1.05E+00	1.17E+00	1.35E+00	1.65E+00	1.88E+00
ETP-fw	CTUe	1.04E+03	1.12E+03	1.28E+03	1.53E+03	1.80E+03
HTP-c	CTUh	2.00E-08	2.17E-08	2.46E-08	3.00E-08	3.64E-08
HTP-nc	CTUh	1.09E-06	1.19E-06	1.36E-06	1.65E-06	2.01E-06
SQP	-	1.68E+02	1.72E+02	1.79E+02	1.94E+02	2.21E+02
Carbon footprint (IPCC AR5, 100yr)						
GWP-GHG	kg CO₂ eq.	257	277	312	372	436

Refer to "Environmental Indicators" p.22-23 for full description of indicators, units and abbreviations.

Darwin region

TABLE C3. ENVIRONMENTAL PARAMETERS (A1-A3), ENVIROCRETE® CONCRETE, DARWIN REGION, PER M³

Indicator	Unit	ENVIROCRETE® 20 MPa	ENVIROCRETE® 25 MPa	ENVIROCRETE® 32 MPa	ENVIROCRETE® 40 MPa	ENVIROCRETE® 50 MPa
PERE	MJ _{NCV}	2.14E+01	2.28E+01	2.52E+01	2.98E+01	3.78E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	2.14E+01	2.28E+01	2.52E+01	2.98E+01	3.78E+01
PENRE	MJ _{NCV}	2.19E+03	2.30E+03	2.54E+03	2.97E+03	3.55E+03
PENRM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ _{NCV}	2.19E+03	2.30E+03	2.54E+03	2.97E+03	3.55E+03
SM	kg	6.45E+01	6.55E+01	7.49E+01	8.94E+01	2.20E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	4.31E+00	4.34E+00	4.43E+00	4.59E+00	4.57E+00
HWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	7.75E-02	8.29E-02	9.28E-02	1.13E-01	1.63E-01
RWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content—Product		N/A	N/A	N/A	N/A	N/A
Biogenic carbon content—Packaging		N/A	N/A	N/A	N/A	N/A

TABLE C4. EN 15804+A1 IMPACT CATEGORIES (A1-A3), ENVIROCRETE® CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	ENVIROCRETE® 20 MPa	ENVIROCRETE® 25 MPa	ENVIROCRETE® 32 MPa	ENVIROCRETE® 40 MPa	ENVIROCRETE® 50 MPa
GWP	kg CO ₂ eq.	257	276	311	371	434
ODP	kg CFC11 eq.	7.89E-06	8.00E-06	8.59E-06	9.65E-06	1.11E-05
AP	kg SO ₂ eq.	1.12E+00	1.19E+00	1.35E+00	1.60E+00	2.02E+00
EP	kg PO ₄ ³⁻ eq.	1.55E-01	1.64E-01	1.84E-01	2.16E-01	2.58E-01
POCP	kg C ₂ H ₄ eq.	8.21E-02	8.46E-02	9.22E-02	1.05E-01	1.24E-01
ADPE	kg Sb eq.	4.06E-06	4.95E-06	4.91E-06	6.18E-06	7.73E-06
ADPF	MJ _{NCV}	2.11E+03	2.22E+03	2.45E+03	2.87E+03	3.43E+03

Refer to "Environmental Indicators" p.22-23 for full description of indicators, units and abbreviations.

Darwin region

TABLE D1. EN 15804+A2 IMPACT CATEGORIES (A1-A3), LOWER CARBON CONCRETE—SPECIAL CLASS AND BLOCKFILL, DARWIN REGION (NT), PER M³

Indicator	Unit	ENVIROCRETE® SPECIAL CLASS 15 MPa	ENVIROCRETE® BLOCKFILL 20 MPa	ENVIROCRETE® BLOCKFILL 25 MPa	ENVIROCRETE® BLOCKFILL 32 MPa
GWP—Total	kg CO₂ eq.	241	267	284	320
GWP—Fossil	kg CO ₂ eq.	240	267	284	320
GWP—Biogenic	kg CO ₂ eq.	1.21E-01	1.40E-01	1.34E-01	1.46E-01
GWP—Luluc	kg CO ₂ eq.	5.99E-04	8.33E-04	6.93E-04	9.17E-04
ODP	kg CFC11 eq.	9.72E-06	1.01E-05	1.01E-05	1.08E-05
AP	mol H+ eq.	1.49E+00	1.69E+00	1.79E+00	1.98E+00
EP—Freshwater	kg P eq.	3.30E-04	3.92E-04	3.97E-04	4.71E-04
EP—Marine	kg N eq.	4.19E-01	4.59E-01	4.88E-01	5.37E-01
EP—Terrestrial	mol N eq.	4.67E+00	5.12E+00	5.44E+00	6.00E+00
POCP	kg NMVOC eq.	1.13E+00	1.24E+00	1.31E+00	1.45E+00
ADP—Minerals and Metals	kg Sb eq.	1.48E-06	2.16E-06	1.53E-06	2.12E-06
ADP—Fossil	MJ (NCV)	2.02E+03	2.25E+03	2.30E+03	2.56E+03
WDP	m ³ eq.	1.90E+03	2.21E+03	2.33E+03	2.67E+03

TABLE D2. EN 15804+A2 ADDITIONAL IMPACT CATEGORIES (A1-A3), LOWER CARBON CONCRETE—SPECIAL CLASS AND BLOCKFILL, DARWIN REGION (NT), PER M³

Indicator	Unit	ENVIROCRETE® SPECIAL CLASS 15 MPa	ENVIROCRETE® BLOCKFILL 20 MPa	ENVIROCRETE® BLOCKFILL 25 MPa	ENVIROCRETE® BLOCKFILL 32 MPa
PM	Disease incidence	8.89E-06	9.37E-06	9.53E-06	1.03E-05
IRP	kBq U235 eq.	9.42E-01	1.07E+00	1.16E+00	1.36E+00
ETP-fw	CTUe	9.58E+02	1.07E+03	1.14E+03	1.29E+03
HTP-c	CTUh	1.83E-08	2.17E-08	2.24E-08	2.59E-08
HTP-nc	CTUh	1.00E-06	1.17E-06	1.24E-06	1.42E-06
SQP	-	1.65E+02	1.78E+02	1.77E+02	1.87E+02
Carbon footprint (IPCC AR5, 100yr)					
GWP-GHG	kg CO₂ eq.	238	264	282	317

Refer to "Environmental Indicators" p.22-23 for full description of indicators, units and abbreviations.

Darwin region

TABLE D3. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE—SPECIAL CLASS AND BLOCKFILL, DARWIN REGION (NT), PER M³

Indicator	Unit	ENVIROCRETE® SPECIAL CLASS 15 MPa	ENVIROCRETE® BLOCKFILL 20 MPa	ENVIROCRETE® BLOCKFILL 25 MPa	ENVIROCRETE® BLOCKFILL 32 MPa
PERE	MJ _{NCV}	2.02E+01	2.40E+01	2.45E+01	2.73E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	2.02E+01	2.40E+01	2.45E+01	2.73E+01
PENRE	MJ _{NCV}	2.08E+03	2.31E+03	2.37E+03	2.62E+03
PENRM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ _{NCV}	2.08E+03	2.31E+03	2.37E+03	2.62E+03
SM	kg	6.86E+01	1.06E+02	1.18E+02	1.16E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	4.26E+00	4.24E+00	4.18E+00	4.26E+00
HWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	7.40E-02	9.66E-02	9.72E-02	1.09E-01
RWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content—Product		N/A	N/A	N/A	N/A
Biogenic carbon content—Packaging		N/A	N/A	N/A	N/A

TABLE D4. EN 15804+A1 IMPACT CATEGORIES (A1-A3), LOWER CARBON CONCRETE—SPECIAL CLASS AND BLOCKFILL, DARWIN REGION (NT), PER M³

Indicator	Unit	ENVIROCRETE® SPECIAL CLASS 15 MPa	ENVIROCRETE® BLOCKFILL 20 MPa	ENVIROCRETE® BLOCKFILL 25 MPa	ENVIROCRETE® BLOCKFILL 32 MPa
GWP	kg CO ₂ eq.	237	264	281	316
ODP	kg CFC11 eq.	7.69E-06	8.04E-06	8.01E-06	8.57E-06
AP	kg SO ₂ eq.	1.05E+00	1.20E+00	1.28E+00	1.42E+00
EP	kg PO ₄ ³⁻ eq.	1.46E-01	1.61E-01	1.70E-01	1.88E-01
POCP	kg C ₂ H ₄ eq.	7.90E-02	8.41E-02	8.59E-02	9.30E-02
ADPE	kg Sb eq.	3.73E-06	4.68E-06	2.30E-06	5.25E-06
ADPF	MJ _{NCV}	2.00E+03	2.23E+03	2.29E+03	2.54E+03

Darwin region

TABLE E1. EN 15804+A2 IMPACT CATEGORIES (A1-A3), LOWER CARBON CONCRETE—ENVIROCRETE® EASY PLACE AND HIGH SLUMP, DARWIN REGION (NT), PER M³

Indicator	Unit	ENVIROCRETE® EASY PLACE 20 MPa	ENVIROCRETE® EASY PLACE 25 MPa	ENVIROCRETE® EASY PLACE 32 MPa	ENVIROCRETE® EASY PLACE 40 MPa	ENVIROCRETE® HIGH SLUMP 50 MPa	ENVIROCRETE® HIGH SLUMP 65 MPa
GWP—Total	kg CO₂ eq.	263	282	314	375	471	476
GWP—Fossil	kg CO ₂ eq.	263	281	314	375	470	476
GWP—Biogenic	kg CO ₂ eq.	1.27E-01	1.28E-01	1.33E-01	1.51E-01	1.85E-01	1.97E-01
GWP—Luluc	kg CO ₂ eq.	6.51E-04	6.89E-04	7.77E-04	1.04E-03	1.35E-03	1.48E-03
ODP	kg CFC11 eq.	1.00E-05	1.01E-05	1.06E-05	1.19E-05	1.43E-05	1.46E-05
AP	mol H+ eq.	1.65E+00	1.73E+00	1.90E+00	2.26E+00	2.94E+00	3.00E+00
EP—Freshwater	kg P eq.	3.64E-04	3.95E-04	4.49E-04	5.57E-04	7.03E-04	7.23E-04
EP—Marine	kg N eq.	4.55E-01	4.80E-01	5.26E-01	6.19E-01	7.80E-01	7.90E-01
EP—Terrestrial	mol N eq.	5.07E+00	5.35E+00	5.88E+00	6.92E+00	8.74E+00	8.85E+00
POCP	kg NMVOC eq.	1.22E+00	1.29E+00	1.42E+00	1.67E+00	2.11E+00	2.14E+00
ADP—Minerals and Metals	kg Sb eq.	1.53E-06	1.53E-06	1.63E-06	2.23E-06	2.96E-06	3.42E-06
ADP—Fossil	MJ (NCV)	2.17E+03	2.26E+03	2.45E+03	2.88E+03	3.63E+03	3.72E+03
WDP	m ³ eq.	2.12E+03	2.28E+03	2.58E+03	3.14E+03	4.00E+03	4.08E+03

TABLE E2. EN 15804+A2 ADDITIONAL IMPACT CATEGORIES (A1-A3), LOWER CARBON CONCRETE—ENVIROCRETE® EASY PLACE AND HIGH SLUMP, DARWIN REGION (NT), PER M³

Indicator	Unit	ENVIROCRETE® EASY PLACE 20 MPa	ENVIROCRETE® EASY PLACE 25 MPa	ENVIROCRETE® EASY PLACE 32 MPa	ENVIROCRETE® EASY PLACE 40 MPa	ENVIROCRETE® HIGH SLUMP 50 MPa	ENVIROCRETE® HIGH SLUMP 65 MPa
PM	Disease incidence	9.29E-06	9.58E-06	1.02E-05	1.15E-05	1.37E-05	1.39E-05
IRP	kBq U235 eq.	1.05E+00	1.16E+00	1.34E+00	1.65E+00	2.07E+00	2.08E+00
ETP-fw	CTUe	1.05E+03	1.13E+03	1.27E+03	1.53E+03	1.93E+03	1.95E+03
HTP-c	CTUh	2.04E-08	2.18E-08	2.45E-08	3.00E-08	3.89E-08	4.00E-08
HTP-nc	CTUh	1.12E-06	1.20E-06	1.36E-06	1.66E-06	2.14E-06	2.19E-06
SQP	-	1.71E+02	1.73E+02	1.79E+02	1.95E+02	2.25E+02	2.32E+02
Carbon footprint (IPCC AR5, 100yr)							
GWP-GHG	kg CO₂ eq.	260	279	311	372	466	471

Refer to "Environmental Indicators" p.22-23 for full description of indicators, units and abbreviations.

Darwin region

TABLE E3. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE—ENVIROCRETE® EASY PLACE AND HIGH SLUMP, DARWIN REGION (NT), PER M³

Indicator	Unit	ENVIROCRETE® EASY PLACE 20 MPa	ENVIROCRETE® EASY PLACE 25 MPa	ENVIROCRETE® EASY PLACE 32 MPa	ENVIROCRETE® EASY PLACE 40 MPa	ENVIROCRETE® HIGH SLUMP 50 MPa	ENVIROCRETE® HIGH SLUMP 65 MPa
PERE	MJ _{NCV}	2.24E+01	2.33E+01	2.53E+01	3.01E+01	3.93E+01	4.10E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	2.24E+01	2.33E+01	2.53E+01	3.01E+01	3.93E+01	4.10E+01
PENRE	MJ _{NCV}	2.23E+03	2.32E+03	2.52E+03	2.96E+03	3.71E+03	3.81E+03
PENRM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ _{NCV}	2.23E+03	2.32E+03	2.52E+03	2.96E+03	3.71E+03	3.81E+03
SM	kg	9.05E+01	8.63E+01	8.53E+01	1.05E+02	2.04E+02	2.25E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	4.27E+00	4.29E+00	4.36E+00	4.56E+00	4.67E+00	4.72E+00
HWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	8.52E-02	8.76E-02	9.44E-02	1.16E-01	1.66E-01	1.77E-01
RWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content—Product		N/A	N/A	N/A	N/A	N/A	N/A
Biogenic carbon content—Packaging		N/A	N/A	N/A	N/A	N/A	N/A

TABLE E4. EN 15804+A1 IMPACT CATEGORIES (A1-A3), LOWER CARBON CONCRETE —ENVIROCRETE® EASY PLACE AND HIGH SLUMP, DARWIN REGION (NT), PER M³

Indicator	Unit	ENVIROCRETE® EASY PLACE 20 MPa	ENVIROCRETE® EASY PLACE 25 MPa	ENVIROCRETE® EASY PLACE 32 MPa	ENVIROCRETE® EASY PLACE 40 MPa	ENVIROCRETE® EASY PLACE 50 MPa	ENVIROCRETE® EASY PLACE 65 MPa
GWP	kg CO ₂ eq.	260	278	310	370	464	470
ODP	kg CFC11 eq.	7.92E-06	8.03E-06	8.39E-06	9.45E-06	1.14E-05	1.16E-05
AP	kg SO ₂ eq.	1.16E+00	1.23E+00	1.35E+00	1.62E+00	2.12E+00	2.17E+00
EP	kg PO ₄ ³⁻ eq.	1.58E-01	1.67E-01	1.83E-01	2.16E-01	2.72E-01	2.76E-01
POCP	kg C ₂ H ₄ eq.	8.30E-02	8.54E-02	9.09E-02	1.04E-01	1.28E-01	1.30E-01
ADPE	kg Sb eq.	3.65E-06	3.95E-06	4.40E-06	5.17E-06	7.21E-06	9.46E-06
ADPF	MJ _{NCV}	2.15E+03	2.24E+03	2.44E+03	2.86E+03	3.60E+03	3.69E+03

Darwin region

TABLE F1. EN 15804+A2 IMPACT CATEGORIES (A1-A3), LOWER CARBON CONCRETE—TREMIE, KERB MACHINE, GROUT, SHOTCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	ENVIROCRETE® TREMIE 40 MPa	ENVIROCRETE® TREMIE 50 MPa	ENVIROCRETE® KERB MACHINE 320 kg / m ³	ENVIROCRETE® GROUT 400 kg / m ³	ENVIROCRETE® SHOTCRETE 32 MPA
GWP—Total	kg CO ₂ eq.	383	475	318	265	361
GWP—Fossil	kg CO ₂ eq.	383	475	317	265	360
GWP—Biogenic	kg CO ₂ eq.	1.61E-01	1.92E-01	1.41E-01	1.65E-01	8.40E-01
GWP—Luluc	kg CO ₂ eq.	1.17E-03	1.43E-03	8.83E-04	8.22E-04	1.67E-02
ODP	kg CFC11 eq.	1.27E-05	1.47E-05	1.07E-05	1.04E-05	1.43E-05
AP	mol H+ eq.	2.33E+00	2.98E+00	1.94E+00	1.92E+00	2.39E+00
EP—Freshwater	kg P eq.	5.78E-04	7.15E-04	4.65E-04	3.69E-04	9.95E-04
EP—Marine	kg N eq.	6.35E-01	7.90E-01	5.31E-01	4.82E-01	6.27E-01
EP—Terrestrial	mol N eq.	7.11E+00	8.84E+00	5.93E+00	5.39E+00	6.99E+00
POCP	kg NMVOC eq.	1.71E+00	2.14E+00	1.43E+00	1.31E+00	1.71E+00
ADP—Minerals and Metals	kg Sb eq.	2.77E-06	3.26E-06	2.00E-06	2.28E-06	2.40E-06
ADP—Fossil	MJ (NCV)	3.01E+03	3.70E+03	2.51E+03	2.41E+03	3.07E+03
WDP	m ³ eq.	3.21E+03	4.05E+03	2.64E+03	2.24E+03	2.80E+03

TABLE F2. EN 15804+A2 ADDITIONAL IMPACT CATEGORIES (A1-A3), LOWER CARBON CONCRETE—TREMIE, KERB MACHINE, GROUT, SHOTCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	ENVIROCRETE® TREMIE 40 MPa	ENVIROCRETE® TREMIE 50 MPa	ENVIROCRETE® KERB MACHINE 320 kg / m ³	ENVIROCRETE® GROUT 400 kg / m ³	ENVIROCRETE® SHOTCRETE 32 MPA
PM	Disease incidence	1.20E-05	1.39E-05	1.04E-05	9.38E-06	1.19E-05
IRP	kBq U235 eq.	1.66E+00	2.08E+00	1.35E+00	9.50E-01	1.90E+00
ETP-fw	CTUe	1.56E+03	1.95E+03	1.28E+03	1.05E+03	1.57E+03
HTP-c	CTUh	3.11E-08	3.96E-08	2.53E-08	2.31E-08	4.74E-08
HTP-nc	CTUh	1.70E-06	2.17E-06	1.39E-06	1.24E-06	1.65E-06
SQP	-	2.01E+02	2.29E+02	1.84E+02	1.95E+02	2.93E+02
Carbon footprint (IPCC AR5, 100yr)						
GWP-GHG	kg CO ₂ eq.	379	470	314	262	357

Refer to "Environmental Indicators" p.22-23 for full description of indicators, units and abbreviations.

Darwin region

TABLE F3. ENVIRONMENTAL PARAMETERS (A1-A3), LOWER CARBON CONCRETE –TREMIE, KERB MACHINE, GROUT, SHOTCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	ENVIROCRETE® TREMIE 40 MPa	ENVIROCRETE® TREMIE 50 MPa	ENVIROCRETE® KERB MACHINE 320 kg / m ³	ENVIROCRETE® GROUT 400 kg / m ³	ENVIROCRETE® SHOTCRETE 32 MPa
PERE	MJ _{NCV}	3.13E+01	4.02E+01	2.65E+01	2.89E+01	6.11E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	3.13E+01	4.02E+01	2.65E+01	2.89E+01	6.11E+01
PENRE	MJ _{NCV}	3.09E+03	3.79E+03	2.58E+03	2.47E+03	3.16E+03
PENRM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ _{NCV}	3.09E+03	3.79E+03	2.58E+03	2.47E+03	3.16E+03
SM	kg	1.15E+02	2.14E+02	9.57E+01	2.54E+02	2.00E+02
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	4.60E+00	4.69E+00	4.47E+00	4.01E+00	1.78E+01
HWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	1.23E-01	1.72E-01	1.02E-01	1.39E-01	1.34E-01
RWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content—Product		N/A	N/A	N/A	N/A	N/A
Biogenic carbon content—Packaging		N/A	N/A	N/A	N/A	N/A

TABLE F4. EN 15804+A1 IMPACT CATEGORIES (A1-A3), LOWER CARBON CONCRETE –TREMIE, KERB MACHINE, GROUT, SHOTCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	ENVIROCRETE® TREMIE 40 MPa	ENVIROCRETE® TREMIE 50 MPa	ENVIROCRETE® KERB MACHINE 320 kg / m ³	ENVIROCRETE® GROUT 400 kg / m ³	ENVIROCRETE® SHOTCRETE 32 MPa
GWP	kg CO ₂ eq.	378	469	313	261	355
ODP	kg CFC11 eq.	1.01E-05	1.17E-05	8.39E-06	8.19E-06	1.13E-05
AP	kg SO ₂ eq.	1.67E+00	2.15E+00	1.38E+00	1.37E+00	1.70E+00
EP	kg PO ₄ ³⁻ eq.	2.22E-01	2.76E-01	1.85E-01	1.69E-01	2.19E-01
POCP	kg C ₂ H ₄ eq.	1.09E-01	1.31E-01	9.17E-02	8.83E-02	1.18E-01
ADPE	kg Sb eq.	7.69E-06	9.08E-06	9.33E-06	7.19E-06	1.01E-05
ADPF	MJ _{NCV}	2.98E+03	3.67E+03	2.48E+03	2.38E+03	3.05E+03

Darwin region

TABLE G1. EN 15804+A2 IMPACT CATEGORIES (A1-A3)—NORMAL GP BLEND CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	NORMAL GP BLEND 20 MPa	NORMAL GP BLEND 25 MPa	NORMAL GP BLEND 32 MPa	NORMAL GP BLEND 40 MPa	NORMAL GP BLEND 50 MPa
GWP—Total	kg CO₂ eq.	296	318	361	432	623
GWP—Fossil	kg CO ₂ eq.	296	318	361	432	622
GWP—Biogenic	kg CO ₂ eq.	1.18E-01	1.22E-01	1.29E-01	1.46E-01	1.72E-01
GWP—Luluc	kg CO ₂ eq.	7.73E-04	8.45E-04	9.63E-04	1.26E-03	1.75E-03
ODP	kg CFC11 eq.	9.65E-06	1.01E-05	1.07E-05	1.19E-05	1.46E-05
AP	mol H+ eq.	1.65E+00	1.77E+00	1.99E+00	2.37E+00	3.36E+00
EP—Freshwater	kg P eq.	4.39E-04	4.76E-04	5.47E-04	6.78E-04	9.90E-04
EP—Marine	kg N eq.	4.78E-01	5.10E-01	5.71E-01	6.72E-01	9.46E-01
EP—Terrestrial	mol N eq.	5.33E+00	5.70E+00	6.39E+00	7.53E+00	1.06E+01
POCP	kg NMVOC eq.	1.28E+00	1.37E+00	1.53E+00	1.81E+00	2.54E+00
ADP—Minerals and Metals	kg Sb eq.	1.57E-06	1.70E-06	1.85E-06	2.47E-06	3.00E-06
ADP—Fossil	MJ (NCV)	2.22E+03	2.36E+03	2.62E+03	3.07E+03	4.18E+03
WDP	m ³ eq.	2.42E+03	2.61E+03	3.00E+03	3.66E+03	5.36E+03

TABLE G2. EN 15804+A2 ADDITIONAL IMPACT CATEGORIES (A1-A3)—NORMAL GP BLEND CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	NORMAL GP BLEND 20 MPa	NORMAL GP BLEND 25 MPa	NORMAL GP BLEND 32 MPa	NORMAL GP BLEND 40 MPa	NORMAL GP BLEND 50 MPa
PM	Disease incidence	9.62E-06	1.01E-05	1.09E-05	1.23E-05	1.59E-05
IRP	kBq U235 eq.	1.32E+00	1.44E+00	1.67E+00	2.06E+00	3.11E+00
ETP-fw	CTUe	1.20E+03	1.29E+03	1.47E+03	1.77E+03	2.58E+03
HTP-c	CTUh	2.25E-08	2.43E-08	2.78E-08	3.41E-08	4.95E-08
HTP-nc	CTUh	1.24E-06	1.34E-06	1.54E-06	1.89E-06	2.78E-06
SQP	-	1.66E+02	1.71E+02	1.78E+02	1.94E+02	2.26E+02
Carbon footprint (IPCC AR5, 100yr)						
GWP-GHG	kg CO₂ eq.	293	315	357	428	617

Refer to "Environmental Indicators" p.22-23 for full description of indicators, units and abbreviations.

Darwin region

TABLE G3. ENVIRONMENTAL PARAMETERS (A1-A3)—NORMAL GP BLEND CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	NORMAL GP BLEND 20 MPa	NORMAL GP BLEND 25 MPa	NORMAL GP BLEND 32 MPa	NORMAL GP BLEND 40 MPa	NORMAL GP BLEND 50 MPa
PERE	MJ _{NCV}	2.17E+01	2.31E+01	2.58E+01	3.07E+01	4.22E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	2.17E+01	2.31E+01	2.58E+01	3.07E+01	4.22E+01
PENRE	MJ _{NCV}	2.28E+03	2.43E+03	2.68E+03	3.15E+03	4.28E+03
PENRM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ _{NCV}	2.28E+03	2.43E+03	2.68E+03	3.15E+03	4.28E+03
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	4.42E+00	4.48E+00	4.59E+00	4.80E+00	5.12E+00
HWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	6.83E-02	7.33E-02	8.26E-02	1.02E-01	1.42E-01
RWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content—Product		N/A	N/A	N/A	N/A	N/A
Biogenic carbon content—Packaging		N/A	N/A	N/A	N/A	N/A

TABLE G4. EN 15804+A1 IMPACT CATEGORIES (A1-A3)—NORMAL GP BLEND CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	NORMAL GP BLEND 20 MPa	NORMAL GP BLEND 25 MPa	NORMAL GP BLEND 32 MPa	NORMAL GP BLEND 40 MPa	NORMAL GP BLEND 50 MPa
GWP	kg CO ₂ eq.	292	314	356	427	615
ODP	kg CFC11 eq.	7.66E-06	7.99E-06	8.49E-06	9.43E-06	1.16E-05
AP	kg SO ₂ eq.	1.17E+00	1.26E+00	1.42E+00	1.70E+00	2.44E+00
EP	kg PO ₄ ³⁻ eq.	1.66E-01	1.78E-01	1.99E-01	2.35E-01	3.30E-01
POCP	kg C ₂ H ₄ eq.	8.18E-02	8.62E-02	9.35E-02	1.06E-01	1.38E-01
ADPE	kg Sb eq.	3.61E-06	4.48E-06	5.08E-06	6.44E-06	7.76E-06
ADPF	MJ _{NCV}	2.21E+03	2.35E+03	2.60E+03	3.05E+03	4.16E+03

Refer to "Environmental Indicators" p.22-23 for full description of indicators, units and abbreviations.

Darwin region

TABLE H1. EN 15804+A2 IMPACT CATEGORIES (A1-A3)—SPECIAL CLASS AND BLOCKFILL CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	SPECIAL CLASS GP 15 MPa	BLOCKFILL 20 MPa	BLOCKFILL 25 MPa	BLOCKFILL 32 MPa
GWP—Total	kg CO₂ eq.	274	345	365	438
GWP—Fossil	kg CO ₂ eq.	274	345	365	438
GWP—Biogenic	kg CO ₂ eq.	1.14E-01	1.35E-01	1.26E-01	1.44E-01
GWP—Luluc	kg CO ₂ eq.	7.02E-04	1.06E-03	9.37E-04	1.25E-03
ODP	kg CFC11 eq.	9.22E-06	1.03E-05	1.01E-05	1.14E-05
AP	mol H+ eq.	1.53E+00	1.91E+00	2.00E+00	2.38E+00
EP—Freshwater	kg P eq.	4.02E-04	5.42E-04	5.56E-04	6.88E-04
EP—Marine	kg N eq.	4.45E-01	5.43E-01	5.72E-01	6.75E-01
EP—Terrestrial	mol N eq.	4.96E+00	6.08E+00	6.40E+00	7.57E+00
POCP	kg NMVOC eq.	1.19E+00	1.46E+00	1.53E+00	1.81E+00
ADP—Minerals and Metals	kg Sb eq.	1.45E-06	2.29E-06	1.64E-06	2.30E-06
ADP—Fossil	MJ (NCV)	2.08E+03	2.55E+03	2.59E+03	3.06E+03
WDP	m ³ eq.	2.22E+03	2.90E+03	3.06E+03	3.73E+03

TABLE H2. EN 15804+A2 ADDITIONAL IMPACT CATEGORIES (A1-A3)—SPECIAL CLASS AND BLOCKFILL CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	SPECIAL CLASS GP 15 MPa	BLOCKFILL 20 MPa	BLOCKFILL 25 MPa	BLOCKFILL 32 MPa
PM	Disease incidence	9.15E-06	1.05E-05	1.06E-05	1.21E-05
IRP	kBq U235 eq.	1.21E+00	1.60E+00	1.73E+00	2.12E+00
ETP-fw	CTUe	1.10E+03	1.41E+03	1.49E+03	1.80E+03
HTP-c	CTUh	2.06E-08	2.73E-08	2.82E-08	3.46E-08
HTP-nc	CTUh	1.14E-06	1.50E-06	1.58E-06	1.92E-06
SQP	-	1.62E+02	1.79E+02	1.77E+02	1.93E+02
Carbon footprint (IPCC AR5, 100yr)					
GWP-GHG	kg CO₂ eq.	271	342	362	434

Refer to "Environmental Indicators" p.22-23 for full description of indicators, units and abbreviations.

Darwin region

TABLE H3. ENVIRONMENTAL PARAMETERS (A1-A3)—SPECIAL CLASS AND BLOCKFILL CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	SPECIAL CLASS GP 15 MPa	BLOCKFILL 20 MPa	BLOCKFILL 25 MPa	BLOCKFILL 32 MPa
PERE	MJ _{NCV}	2.04E+01	2.56E+01	2.60E+01	3.10E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	2.04E+01	2.56E+01	2.60E+01	3.10E+01
PENRE	MJ _{NCV}	2.14E+03	2.61E+03	2.66E+03	3.13E+03
PENRM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ _{NCV}	2.14E+03	2.61E+03	2.66E+03	3.13E+03
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	4.36E+00	4.53E+00	4.42E+00	4.65E+00
HWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	6.34E-02	8.47E-02	8.29E-02	1.02E-01
RWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content—Product		N/A	N/A	N/A	N/A
Biogenic carbon content—Packaging		N/A	N/A	N/A	N/A

TABLE H4. EN 15804+A1 IMPACT CATEGORIES (A1-A3)—SPECIAL CLASS AND BLOCKFILL CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	SPECIAL CLASS GP 15 MPa	BLOCKFILL 20 MPa	BLOCKFILL 25 MPa	BLOCKFILL 32 MPa
GWP	kg CO ₂ eq.	270	341	361	433
ODP	kg CFC11 eq.	7.32E-06	8.23E-06	8.05E-06	9.07E-06
AP	kg SO ₂ eq.	1.08E+00	1.36E+00	1.43E+00	1.72E+00
EP	kg PO ₄ ³⁻ eq.	1.55E-01	1.90E-01	1.99E-01	2.36E-01
POCP	kg C ₂ H ₄ eq.	7.74E-02	8.97E-02	9.04E-02	1.04E-01
ADPE	kg Sb eq.	3.12E-06	4.84E-06	2.45E-06	5.25E-06
ADPF	MJ _{NCV}	2.07E+03	2.53E+03	2.58E+03	3.05E+03

Refer to "Environmental Indicators" p.22-23 for full description of indicators, units and abbreviations.

Darwin region

TABLE I1. EN 15804+A2 IMPACT CATEGORIES (A1-A3)—EASY PLACE AND HIGH SLUMP CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	EASY PLACE 20 MPa	EASY PLACE 25 MPa	EASY PLACE 32 MPa	EASY PLACE 40 MPa	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa
GWP—Total	kg CO₂ eq.	325	340	373	448	629	641
GWP—Fossil	kg CO ₂ eq.	325	340	373	447	629	641
GWP—Biogenic	kg CO ₂ eq.	1.23E-01	1.24E-01	1.31E-01	1.44E-01	1.87E-01	1.66E-01
GWP—Luluc	kg CO ₂ eq.	8.56E-04	8.86E-04	1.01E-03	1.24E-03	2.01E-03	1.68E-03
ODP	kg CFC11 eq.	1.04E-05	1.06E-05	1.11E-05	1.22E-05	1.52E-05	1.47E-05
AP	mol H+ eq.	1.81E+00	1.89E+00	2.06E+00	2.45E+00	3.40E+00	3.44E+00
EP—Freshwater	kg P eq.	4.84E-04	5.09E-04	5.67E-04	6.95E-04	1.03E-03	1.00E-03
EP—Marine	kg N eq.	5.22E-01	5.45E-01	5.91E-01	6.97E-01	9.53E-01	9.74E-01
EP—Terrestrial	mol N eq.	5.83E+00	6.09E+00	6.61E+00	7.80E+00	1.07E+01	1.09E+01
POCP	kg NMVOC eq.	1.40E+00	1.46E+00	1.59E+00	1.87E+00	2.56E+00	2.62E+00
ADP—Minerals and Metals	kg Sb eq.	1.73E-06	1.73E-06	1.97E-06	2.32E-06	3.92E-06	2.59E-06
ADP—Fossil	MJ (NCV)	2.41E+03	2.50E+03	2.71E+03	3.15E+03	4.30E+03	4.25E+03
WDP	m ³ eq.	2.66E+03	2.80E+03	3.10E+03	3.78E+03	5.46E+03	5.49E+03

TABLE I2. EN 15804+A2 ADDITIONAL IMPACT CATEGORIES (A1-A3)—EASY PLACE AND HIGH SLUMP CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	EASY PLACE 20 MPa	EASY PLACE 25 MPa	EASY PLACE 32 MPa	EASY PLACE 40 MPa	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa
PM	Disease incidence	1.03E-05	1.05E-05	1.12E-05	1.26E-05	1.62E-05	1.61E-05
IRP	kBq U235 eq.	1.47E+00	1.56E+00	1.73E+00	2.14E+00	3.13E+00	3.21E+00
ETP-fw	CTUe	1.32E+03	1.39E+03	1.52E+03	1.84E+03	2.61E+03	2.66E+03
HTP-c	CTUh	2.47E-08	2.60E-08	2.88E-08	3.50E-08	5.10E-08	5.05E-08
HTP-nc	CTUh	1.37E-06	1.44E-06	1.60E-06	1.95E-06	2.83E-06	2.85E-06
SQP	-	1.72E+02	1.74E+02	1.81E+02	1.95E+02	2.34E+02	2.26E+02
Carbon footprint (IPCC AR5, 100yr)							
GWP-GHG	kg CO₂ eq.	321	337	369	443	623	635

Refer to "Environmental Indicators" p.22-23 for full description of indicators, units and abbreviations.

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TABLE 13. ENVIRONMENTAL PARAMETERS (A1-A3)—EASY PLACE AND HIGH SLUMP CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	EASY PLACE 20 MPa	EASY PLACE 25 MPa	EASY PLACE 32 MPa	EASY PLACE 40 MPa	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa
PERE	MJ _{NCV}	2.34E+01	2.42E+01	2.64E+01	3.12E+01	4.37E+01	4.26E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	2.34E+01	2.42E+01	2.64E+01	3.12E+01	4.37E+01	4.26E+01
PENRE	MJ _{NCV}	2.48E+03	2.57E+03	2.78E+03	3.23E+03	4.41E+03	4.35E+03
PENRM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ _{NCV}	2.48E+03	2.57E+03	2.78E+03	3.23E+03	4.41E+03	4.35E+03
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	4.48E+00	4.49E+00	4.59E+00	4.76E+00	5.24E+00	5.04E+00
HWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	7.37E-02	7.65E-02	8.48E-02	1.02E-01	1.51E-01	1.41E-01
RWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content—Product		N/A	N/A	N/A	N/A	N/A	N/A
Biogenic carbon content—Packaging		N/A	N/A	N/A	N/A	N/A	N/A

TABLE 14. EN 15804+A1 IMPACT CATEGORIES (A1-A3)—EASY PLACE AND HIGH SLUMP CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	EASY PLACE 20 MPa	EASY PLACE 25 MPa	EASY PLACE 32 MPa	EASY PLACE 40 MPa	HIGH SLUMP 50 MPa	HIGH SLUMP 65 MPa
GWP	kg CO ₂ eq.	321	336	368	442	621	633
ODP	kg CFC11 eq.	8.24E-06	8.44E-06	8.84E-06	9.67E-06	1.20E-05	1.16E-05
AP	kg SO ₂ eq.	1.28E+00	1.34E+00	1.47E+00	1.76E+00	2.47E+00	2.51E+00
EP	kg PO ₄ ³⁻ eq.	1.82E-01	1.90E-01	2.06E-01	2.43E-01	3.34E-01	3.39E-01
POCP	kg C ₂ H ₄ eq.	8.86E-02	9.13E-02	9.71E-02	1.09E-01	1.42E-01	1.41E-01
ADPE	kg Sb eq.	3.54E-06	2.54E-06	4.35E-06	5.43E-06	1.16E-05	7.80E-06
ADPF	MJ _{NCV}	2.40E+03	2.49E+03	2.69E+03	3.13E+03	4.28E+03	4.23E+03

Refer to "Environmental Indicators" p.22-23 for full description of indicators, units and abbreviations.

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TABLE J1. EN 15804+A2 IMPACT CATEGORIES (A1-A3)—TREMIE, KERB MACHINE, GROUT, SHOTCRETE CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	TREMIE 40 MPa	TREMIE 50 MPa	KERB MACHINE 320kg / m ³	GROUT 400kg / m ³	SHOTCRETE 32 MPa
GWP—Total	kg CO₂ eq.	531	617	396	474	410
GWP—Fossil	kg CO ₂ eq.	531	616	396	474	409
GWP—Biogenic	kg CO ₂ eq.	1.63E-01	1.79E-01	1.37E-01	1.54E-01	8.16E-01
GWP—Luluc	kg CO ₂ eq.	1.58E-03	1.86E-03	1.11E-03	1.44E-03	1.69E-02
ODP	kg CFC11 eq.	1.37E-05	1.49E-05	1.08E-05	1.09E-05	1.32E-05
AP	mol H+ eq.	2.89E+00	3.33E+00	2.17E+00	2.55E+00	2.29E+00
EP—Freshwater	kg P eq.	8.45E-04	9.93E-04	6.16E-04	7.69E-04	1.12E-03
EP—Marine	kg N eq.	8.16E-01	9.38E-01	6.17E-01	7.14E-01	6.46E-01
EP—Terrestrial	mol N eq.	9.15E+00	1.05E+01	6.90E+00	8.01E+00	7.22E+00
POCP	kg NMVOC eq.	2.19E+00	2.52E+00	1.66E+00	1.92E+00	1.75E+00
ADP—Minerals and Metals	kg Sb eq.	3.03E-06	3.49E-06	2.11E-06	2.61E-06	2.39E-06
ADP—Fossil	MJ (NCV)	3.69E+03	4.20E+03	2.82E+03	3.23E+03	3.06E+03
WDP	m ³ eq.	4.54E+03	5.32E+03	3.35E+03	4.13E+03	3.26E+03

TABLE J2. EN 15804+A2 ADDITIONAL IMPACT CATEGORIES (A1-A3)—TREMIE, KERB MACHINE, GROUT, SHOTCRETE CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	TREMIE 40 MPa	TREMIE 50 MPa	KERB MACHINE 320kg / m ³	GROUT 400kg / m ³	SHOTCRETE 32 MPa
PM	Disease incidence	1.43E-05	1.59E-05	1.15E-05	1.24E-05	1.22E-05
IRP	kBq U235 eq.	2.59E+00	3.06E+00	1.88E+00	2.36E+00	2.37E+00
ETP-fw	CTUe	2.19E+03	2.56E+03	1.62E+03	1.95E+03	1.79E+03
HTP-c	CTUh	4.23E-08	4.95E-08	3.11E-08	3.83E-08	5.01E-08
HTP-nc	CTUh	2.35E-06	2.76E-06	1.72E-06	2.13E-06	1.81E-06
SQP	-	2.12E+02	2.29E+02	1.86E+02	2.02E+02	2.79E+02
Carbon footprint (IPCC AR5, 100yr)						
GWP-GHG	kg CO₂ eq.	526	611	392	470	406

Refer to "Environmental Indicators" p.22-23 for full description of indicators, units and abbreviations.

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TABLE J3. ENVIRONMENTAL PARAMETERS (A1-A3)—TREMIE, KERB MACHINE, GROUT, SHOTCRETE CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	TREMIE 40 MPa	TREMIE 50 MPa	KERB MACHINE 320kg / m ³	GROUT 400kg / m ³	SHOTCRETE 32 MPa
PERE	MJ _{NCV}	3.68E+01	4.23E+01	2.85E+01	3.41E+01	5.83E+01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	3.68E+01	4.23E+01	2.85E+01	3.41E+01	5.83E+01
PENRE	MJ _{NCV}	3.78E+03	4.30E+03	2.88E+03	3.30E+03	3.14E+03
PENRM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ _{NCV}	3.78E+03	4.30E+03	2.88E+03	3.30E+03	3.14E+03
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	4.99E+00	5.16E+00	4.68E+00	4.65E+00	1.81E+01
HWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	1.24E-01	1.44E-01	9.36E-02	1.16E-01	9.19E-02
RWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content—Product		N/A	N/A	N/A	N/A	N/A
Biogenic carbon content—Packaging		N/A	N/A	N/A	N/A	N/A

TABLE J4. EN 15804+A1 IMPACT CATEGORIES (A1-A3)—TREMIE, KERB MACHINE, GROUT, SHOTCRETE CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	TREMIE 40 MPa	TREMIE 50 MPa	KERB MACHINE 320kg / m ³	GROUT 400kg / m ³	SHOTCRETE 32 MPa
GWP	kg CO ₂ eq.	524	609	390	468	404
ODP	kg CFC11 eq.	1.09E-05	1.19E-05	8.50E-06	8.65E-06	1.05E-05
AP	kg SO ₂ eq.	2.09E+00	2.42E+00	1.56E+00	1.85E+00	1.63E+00
EP	kg PO ₄ ³⁻ eq.	2.85E-01	3.28E-01	2.15E-01	2.50E-01	2.26E-01
POCP	kg C ₂ H ₄ eq.	1.25E-01	1.40E-01	9.69E-02	1.04E-01	1.12E-01
ADPE	kg Sb eq.	8.02E-06	9.38E-06	9.48E-06	7.62E-06	9.81E-06
ADPF	MJ _{NCV}	3.66E+03	4.18E+03	2.79E+03	3.21E+03	3.05E+03

Refer to "Environmental Indicators" p.22-23 for full description of indicators, units and abbreviations.

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TABLE K1. EN 15804+A2 IMPACT CATEGORIES (A1-A3)—POST-TENSIONED AND LOW HEAT CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	POST TENSIONED 40 MPa 22@5	SPECIAL CLASS LOW HEAT S50	SPECIAL CLASS LOW HEAT S55	SPECIAL CLASS LOW HEAT S65
GWP—Total	kg CO ₂ eq.	474	464	442	308	308	323
GWP—Fossil	kg CO ₂ eq.	474	464	442	308	307	323
GWP—Biogenic	kg CO ₂ eq.	1.49E-01	1.53E-01	1.41E-01	1.86E-01	1.77E-01	1.93E-01
GWP—Luluc	kg CO ₂ eq.	1.33E-03	1.39E-03	1.20E-03	9.52E-04	7.91E-04	1.01E-03
ODP	kg CFC11 eq.	1.25E-05	1.23E-05	1.21E-05	1.31E-05	1.28E-05	1.36E-05
AP	mol H+ eq.	2.59E+00	2.53E+00	2.42E+00	2.32E+00	2.32E+00	2.44E+00
EP—Freshwater	kg P eq.	7.40E-04	7.37E-04	6.81E-04	4.16E-04	3.96E-04	4.39E-04
EP—Marine	kg N eq.	7.35E-01	7.17E-01	6.90E-01	5.77E-01	5.80E-01	6.04E-01
EP—Terrestrial	mol N eq.	8.23E+00	8.03E+00	7.73E+00	6.45E+00	6.47E+00	6.75E+00
POCP	kg NMVOC eq.	1.97E+00	1.93E+00	1.85E+00	1.57E+00	1.58E+00	1.65E+00
ADP—Minerals and Metals	kg Sb eq.	2.44E-06	2.71E-06	2.19E-06	2.81E-06	2.21E-06	2.96E-06
ADP—Fossil	MJ (NCV)	3.31E+03	3.27E+03	3.11E+03	2.88E+03	2.83E+03	3.01E+03
WDP	m ³ eq.	4.02E+03	3.96E+03	3.72E+03	2.56E+03	2.53E+03	2.69E+03

TABLE K2. EN 15804+A2 ADDITIONAL IMPACT CATEGORIES (A1-A3)—POST-TENSIONED AND LOW HEAT CONCRETE, DARWIN REGION, PER M³

Indicator	Unit	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	POST TENSIONED 40 MPa 22@5	SPECIAL CLASS LOW HEAT S50	SPECIAL CLASS LOW HEAT S55	SPECIAL CLASS LOW HEAT S65
PM	Disease incidence	1.31E-05	1.29E-05	1.25E-05	1.11E-05	1.09E-05	1.15E-05
IRP	kBq U235 eq.	2.29E+00	2.24E+00	2.11E+00	1.05E+00	1.05E+00	1.11E+00
ETP-fw	CTUe	1.95E+03	1.91E+03	1.82E+03	1.23E+03	1.23E+03	1.29E+03
HTP-c	CTUh	3.73E-08	3.69E-08	3.44E-08	2.68E-08	2.62E-08	2.83E-08
HTP-nc	CTUh	2.08E-06	2.05E-06	1.92E-06	1.44E-06	1.43E-06	1.52E-06
SQP	-	2.00E+02	2.01E+02	1.93E+02	2.14E+02	2.10E+02	2.19E+02
Carbon footprint (IPCC AR5, 100yr)							
GWP-GHG	kg CO ₂ eq.	470	460	438	304	304	319

Refer to "Environmental Indicators" p.22-23 for full description of indicators, units and abbreviations.

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TABLE K3. ENVIRONMENTAL PARAMETERS (A1-A3)—POST-TENSIONED AND LOW HEAT CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	POST TENSIONED 40 MPa 22@5	SPECIAL CLASS LOW HEAT S50	SPECIAL CLASS LOW HEAT S55	SPECIAL CLASS LOW HEAT S65
PERE	Mj _{NCV}	3.29E+01	3.29E+01	3.07E+01	3.35E+01	3.29E+01	3.52E+01
PERM	Mj _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	Mj _{NCV}	3.29E+01	3.29E+01	3.07E+01	3.35E+01	3.29E+01	3.52E+01
PENRE	Mj _{NCV}	3.39E+03	3.35E+03	3.19E+03	2.96E+03	2.91E+03	3.09E+03
PENRM	Mj _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	Mj _{NCV}	3.39E+03	3.35E+03	3.19E+03	2.96E+03	2.91E+03	3.09E+03
SM	kg	0.00E+00	0.00E+00	0.00E+00	3.31E+02	3.38E+02	3.52E+02
RSF	Mj _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	Mj _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	4.83E+00	4.85E+00	4.74E+00	4.26E+00	4.14E+00	4.27E+00
HWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	1.09E-01	1.10E-01	9.97E-02	1.68E-01	1.64E-01	1.77E-01
RWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	Mj	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content—Product		N/A	N/A	N/A	N/A	N/A	N/A
Biogenic carbon content—Packaging		N/A	N/A	N/A	N/A	N/A	N/A

TABLE K4. EN 15804+A1 IMPACT CATEGORIES (A1-A3)—POST-TENSIONED AND LOW HEAT CONCRETE, DARWIN REGION (NT), PER M³

Indicator	Unit	POST TENSIONED 40 MPa 22@3	POST TENSIONED 40 MPa 22@4	POST TENSIONED 40 MPa 22@5	SPECIAL CLASS LOW HEAT S50	SPECIAL CLASS LOW HEAT S55	SPECIAL CLASS LOW HEAT S65
GWP	kg CO₂ eq.	468	458	436	304	303	318
ODP	kg CFC11 eq.	9.95E-06	9.78E-06	9.58E-06	1.05E-05	1.01E-05	1.07E-05
AP	kg SO ₂ eq.	1.87E+00	1.82E+00	1.74E+00	1.65E+00	1.66E+00	1.74E+00
EP	kg PO ₄ ³⁻ eq.	2.56E-01	2.51E-01	2.40E-01	2.03E-01	2.02E-01	2.11E-01
POCP	kg C ₂ H ₄ eq.	1.14E-01	1.11E-01	1.09E-01	1.10E-01	1.08E-01	1.14E-01
ADPE	kg Sb eq.	6.86E-06	7.02E-06	7.24E-06	2.93E-06	7.73E-06	8.71E-06
ADPF	Mj _{NCV}	3.29E+03	3.25E+03	3.09E+03	2.86E+03	2.80E+03	2.97E+03

Refer to "Environmental Indicators" p.22-23 for full description of indicators, units and abbreviations.

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TABLE L1. EN 15804+A2 IMPACT CATEGORIES (A1-A3)—STABILISED SAND AND NO FINES, DARWIN REGION (NT), PER M³

Indicator	Unit	STABILISED SAND 3%	STABILISED SAND 5%	STABILISED SAND 7%	STABILISED SAND 10%	STABILISED SAND 20%	NO FINES 6:1
GWP—Total	kg CO₂ eq.	111	132	181	238	422	288
GWP—Fossil	kg CO ₂ eq.	110	132	181	238	422	288
GWP—Biogenic	kg CO ₂ eq.	8.58E-02	8.98E-02	9.83E-02	1.07E-01	1.35E-01	1.03E-01
GWP—Luluc	kg CO ₂ eq.	2.23E-04	3.01E-04	4.51E-04	6.08E-04	1.13E-03	6.00E-04
ODP	kg CFC11 eq.	5.81E-06	6.14E-06	6.91E-06	7.58E-06	1.07E-05	8.96E-06
AP	mol H+ eq.	6.59E-01	7.71E-01	1.03E+00	1.32E+00	2.29E+00	1.59E+00
EP—Freshwater	kg P eq.	1.37E-04	1.75E-04	2.57E-04	3.53E-04	6.57E-04	4.12E-04
EP—Marine	kg N eq.	2.00E-01	2.31E-01	3.01E-01	3.82E-01	6.50E-01	4.64E-01
EP—Terrestrial	mol N eq.	2.21E+00	2.56E+00	3.35E+00	4.26E+00	7.28E+00	5.18E+00
POCP	kg NMVOC eq.	5.33E-01	6.15E-01	8.04E-01	1.02E+00	1.75E+00	1.24E+00
ADP—Minerals and Metals	kg Sb eq.	6.49E-07	7.92E-07	1.02E-06	1.19E-06	1.94E-06	9.44E-07
ADP—Fossil	MJ (NCV)	1.04E+03	1.18E+03	1.47E+03	1.80E+03	2.92E+03	2.10E+03
WDP	m ³ eq.	7.94E+02	9.91E+02	1.43E+03	1.95E+03	3.59E+03	2.32E+03

TABLE L2. EN 15804+A2 ADDITIONAL IMPACT CATEGORIES (A1-A3)—STABILISED SAND AND NO FINES, DARWIN REGION (NT), PER M³

Indicator	Unit	STABILISED SAND 3%	STABILISED SAND 5%	STABILISED SAND 7%	STABILISED SAND 10%	STABILISED SAND 20%	NO FINES 6:1
PM	Disease incidence	5.43E-06	5.84E-06	6.82E-06	7.91E-06	1.15E-05	8.89E-06
IRP	kBq U235 eq.	3.58E-01	4.76E-01	7.40E-01	1.06E+00	2.05E+00	1.31E+00
ETP-fw	CTUe	4.12E+02	5.04E+02	7.10E+02	9.53E+02	1.74E+03	1.17E+03
HTP-c	CTUh	7.49E-09	9.34E-09	1.34E-08	1.81E-08	3.32E-08	2.13E-08
HTP-nc	CTUh	3.93E-07	4.96E-07	7.24E-07	9.97E-07	1.85E-06	1.20E-06
SQP	-	1.31E+02	1.35E+02	1.44E+02	1.55E+02	1.88E+02	1.58E+02
Carbon footprint (IPCC AR5, 100yr)							
GWP-GHG	kg CO₂ eq.	109	131	179	236	418	286

Refer to "Environmental Indicators" p.22-23 for full description of indicators, units and abbreviations.

Darwin region

TABLE L3. ENVIRONMENTAL PARAMETERS (A1-A3)—STABILISED SAND AND NO FINES, DARWIN REGION (NT), PER M³

Indicator	Unit	STABILISED SAND 3%	STABILISED SAND 5%	STABILISED SAND 7%	STABILISED SAND 10%	STABILISED SAND 20%	NO FINES 6:1
PERE	Mj _{NCV}	1.02E+01	1.16E+01	1.47E+01	1.84E+01	2.96E+01	2.00E+01
PERM	Mj _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	Mj _{NCV}	1.02E+01	1.16E+01	1.47E+01	1.84E+01	2.96E+01	2.00E+01
PENRE	Mj _{NCV}	1.08E+03	1.21E+03	1.51E+03	1.85E+03	2.99E+03	2.16E+03
PENRM	Mj _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	Mj _{NCV}	1.08E+03	1.21E+03	1.51E+03	1.85E+03	2.99E+03	2.16E+03
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	Mj _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	Mj _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.57E+00	3.60E+00	3.76E+00	3.94E+00	4.33E+00	3.67E+00
HWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	2.70E-02	3.22E-02	4.35E-02	5.70E-02	9.63E-02	5.82E-02
RWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01	9.60E+01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	Mj	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content—Product		N/A	N/A	N/A	N/A	N/A	N/A
Biogenic carbon content—Packaging		N/A	N/A	N/A	N/A	N/A	N/A

TABLE L4. EN 15804+A1 IMPACT CATEGORIES (A1-A3)—STABILISED SAND AND NO FINES, DARWIN REGION (NT), PER M³

Indicator	Unit	STABILISED SAND 3%	STABILISED SAND 5%	STABILISED SAND 7%	STABILISED SAND 10%	STABILISED SAND 20%	NO FINES 6:1
GWP	kg CO ₂ eq.	109	130	178	235	417	285
ODP	kg CFC11 eq.	4.58E-06	4.85E-06	5.48E-06	6.04E-06	8.50E-06	7.13E-06
AP	kg SO ₂ eq.	4.36E-01	5.21E-01	7.12E-01	9.33E-01	1.65E+00	1.14E+00
EP	kg PO ₄ ³⁻ eq.	6.95E-02	8.03E-02	1.05E-01	1.33E-01	2.26E-01	1.61E-01
POCP	kg C ₂ H ₄ eq.	4.33E-02	4.71E-02	5.58E-02	6.46E-02	9.86E-02	7.77E-02
ADPE	kg Sb eq.	6.80E-07	1.44E-06	2.11E-06	1.28E-06	3.55E-06	1.04E-06
ADPF	Mj _{NCV}	1.03E+03	1.16E+03	1.46E+03	1.79E+03	2.91E+03	2.09E+03

Refer to "Environmental Indicators" p.22-23 for full description of indicators, units and abbreviations.

Darwin region

TABLE M1. EN 15804+A2 IMPACT CATEGORIES, END-OF-LIFE (C1-C4, D)—ALL CONCRETE MIXES, DARWIN REGION (NT), PER M³

Indicator	Unit	MODULE C1 Demolition of concrete	MODULE C2 Transport of concrete to disposal	MODULE C3 Concrete recycling	MODULE C4 Concrete in landfill	MODULE D Benefits and impacts of concrete recycling – Ready mixed with virgin aggregates
GWP—Total	kg CO₂ eq.	12.2	15.3	1.09	5.00	-1.84
GWP—Fossil	kg CO ₂ eq.	12.2	15.3	1.09	5.00	-1.84
GWP—Biogenic	kg CO ₂ eq.	1.27E-03	1.41E-03	1.41E-03	6.21E-04	-2.21E-03
GWP—Luluc	kg CO ₂ eq.	6.01E-06	7.10E-06	4.91E-07	2.40E-06	-5.96E-07
ODP	kg CFC11 eq.	2.01E-06	2.37E-06	1.34E-07	8.11E-07	-1.96E-07
AP	mol H+ eq.	1.39E-01	1.33E-01	3.94E-03	1.24E-02	-1.47E-02
EP—Freshwater	kg P eq.	1.81E-06	1.06E-06	9.20E-07	7.50E-07	-1.07E-06
EP—Marine	kg N eq.	6.02E-02	4.18E-02	6.52E-04	2.21E-03	-5.86E-03
EP—Terrestrial	mol N eq.	6.60E-01	4.58E-01	7.09E-03	2.41E-02	-6.54E-02
POCP	kg NMVOC eq.	1.59E-01	1.12E-01	1.90E-03	6.49E-03	-1.55E-02
ADP—Minerals and Metals	kg Sb eq.	1.48E-08	1.74E-08	2.63E-07	5.81E-09	-6.25E-08
ADP—Fossil	MJ (NCV)	1.75E+02	2.06E+02	1.47E+01	7.03E+01	-2.62E+01
WDP	m ³ eq.	1.02E+01	1.12E+01	1.45E+01	5.07E+00	-1.79E+01

TABLE M2. EN 15804+A2 ADDITIONAL IMPACT CATEGORIES, END-OF-LIFE (C1-C4, D)—ALL CONCRETE MIXES, DARWIN REGION (NT), PER M³

Indicator	Unit	MODULE C1 Demolition of concrete	MODULE C2 Transport of concrete to disposal	MODULE C3 Concrete recycling	MODULE C4 Concrete in landfill	MODULE D Benefits and impacts of concrete recycling – Ready mixed with virgin aggregates
PM	Disease incidence	3.66E-06	7.54E-07	2.84E-08	6.76E-08	-3.58E-07
IRP	kBq U235 eq.	2.56E-04	3.02E-04	2.14E-04	1.03E-04	-2.88E-05
ETP-fw	CTUe	5.04E+01	5.93E+01	3.92E+00	2.00E+01	-6.96E+00
HTP-c	CTUh	6.28E-10	2.50E-10	1.78E-10	1.84E-10	-9.94E-11
HTP-nc	CTUh	5.79E-08	2.01E-08	5.95E-09	1.81E-08	-6.00E-09
SQP	-	8.18E-01	9.03E-01	2.88E+03	7.62E+01	-1.77E+00
Carbon footprint (IPCC AR5, 100yr)						
GWP-GHG	kg CO₂ eq.	12.1	15.1	1.09	4.97	-1.81

Refer to "Environmental Indicators" p.22-23 for full description of indicators, units and abbreviations.

Darwin region

TABLE M3. ENVIRONMENTAL PARAMETERS (C1-C4, D)—ALL CONCRETE MIXES, DARWIN REGION (NT), PER M³

Indicator	Unit	MODULE C1 Demolition of concrete	MODULE C2 Transport of concrete to disposal	MODULE C3 Concrete recycling	MODULE C4 Concrete in landfill	MODULE D Benefits and impacts of concrete recycling – Ready mixed with virgin aggregates
PERE	MJ _{NCV}	2.39E-01	2.62E-01	2.32E-01	1.22E-01	-2.20E-01
PERM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ _{NCV}	2.39E-01	2.62E-01	2.32E-01	1.22E-01	-2.20E-01
PENRE	MJ _{NCV}	1.85E+02	2.19E+02	1.54E+01	7.45E+01	-2.72E+01
PENRM	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ _{NCV}	1.85E+02	2.19E+02	1.54E+01	7.45E+01	-2.72E+01
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ _{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	2.54E-02	3.00E-02	5.46E-03	1.03E-02	-3.59E-01
HWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	1.78E-03	1.95E-03	1.64E-03	2.09E+03	-4.45E-04
RWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	2.59E+02	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TABLE M4. EN 15804+A1 IMPACT CATEGORIES (C1-C4, D)—ALL CONCRETE MIXES, DARWIN REGION, PER M³

Indicator	Unit	MODULE C1 Demolition of concrete	MODULE C2 Transport of concrete to disposal	MODULE C3 Concrete recycling	MODULE C4 Concrete in landfill	MODULE D Benefits and impacts of concrete recycling – Ready mixed with virgin aggregates
GWP	kg CO ₂ eq.	1.21E+01	1.50E+01	1.08E+00	4.96E+00	-1.82E+00
ODP	kg CFC11 eq.	1.58E-06	1.87E-06	1.06E-07	6.40E-07	-1.55E-07
AP	kg SO ₂ eq.	9.82E-02	7.34E-02	1.99E-03	9.61E-03	-1.01E-02
EP	kg PO ₄ ³⁻ eq.	2.02E-02	1.41E-02	2.26E-04	7.59E-04	-2.09E-03
POCP	kg C ₂ H ₄ eq.	1.15E-02	1.60E-02	2.34E-04	1.27E-03	-1.16E-03
ADPE	kg Sb eq.	1.48E-08	1.75E-08	2.63E-07	5.85E-09	-6.26E-08
ADPF	MJ _{NCV}	1.65E+02	2.12E+02	2.35E+01	7.05E+01	-2.35E+01

Other environmental information

Water management

Water is a valuable resource and good quality fresh water is essential to our concrete, construction material operations. We use water in manufacturing, and for dust suppression, cleaning and sanitation. Our quarry and asphalt operations are able to use recycled, brackish and/or process water.

At our larger sites, including quarries, we also capture rainfall or stream flow that is largely used for dust control purposes. We are developing systems that will enable us to collect data on captured rainfall and are developing plans that will underpin an overall improvement in water efficiency.

When developing or purchasing new facilities, our due diligence assessment includes scenario analysis of the quantity and quality of water, assessment of the risks of potential water discharges, and, where relevant, river catchment assessments to ensure sufficient water availability and supply.

Waste and recycling

Throughout Boral's operations, some materials are commonly re-used back into our production processes. Returned concrete is used to make concrete blocks at some plants. This beneficially uses materials that would otherwise require disposal. A large proportion of Boral's recycled and lower carbon products revenue, totalling nine per cent of Boral Limited revenue, is derived from external waste products.

This includes our fly ash and recycling businesses. Opportunities for the re-use of production by-products or waste material continues to grow and are actively being pursued.

Biodiversity management

Protecting the diversity of plant and animal species at and around our operational sites is a core component of our land management efforts. Some examples of the many initiatives to protect biodiversity at our own sites include:

- Conservation work to provide habitat for the threatened **legless lizard** and **spiny rice-flower** at Deer Park Quarry in Victoria.
- Maintaining **koala fodder plantations** at Narangba and Petrie quarries in Queensland.
- Collaborating with the **Royal Botanic Garden Sydney NSW** in research on the endangered Illawarra Socketwood population at our Dunmore Quarry in New South Wales.
- Partnering with **Sleepy Burrows Wombat Sanctuary** to capture and relocate wombats found at our Peppertree Quarry in New South Wales.
- Boral in WA has completed a number of community projects at **Orange Grove Primary School** including a Heritage Garden space, installation of garden pathways and cockatoo nesting boxes.
- Construction of a **bird island habitat** as part of our rehabilitation of wetlands at our Dunmore Quarry in New South Wales.
- Through our community partnership with **Conservation Volunteers Australia**, we support conservation and education initiatives in our local communities, including native vegetation initiatives in local reserves and schools.

Our approach to climate related risks

Our approach

Boral recognises that climate related physical risks and a global transition to a lower-carbon future are expected to impact our operations, customers and suppliers. We support the Paris Agreement and mechanisms to achieve its objective of limiting future average global temperature rises to well below 2°C, as well as Australia’s 2030 target of a 26–28% reduction in carbon emissions below 2005 levels.

Looking at how Boral’s carbon emissions are tracking relative to 2005 levels, in Australia we have reduced emissions by around 40% since FY2005. We achieved about half of this decrease largely by realigning our portfolio away from emissions-intensive businesses. The remainder of the decrease is due to reducing clinker manufacturing in Australia in favour of importing it from more efficient and larger scale operations in Asia. Including Boral North America, our Scope 1 and 2 emissions decreased by 43% since FY2005. We continue to progressively adopt the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD). In FY2019, we enhanced our climate-related governance and risk management, completed scenario analysis of Boral Cement’s business and continued to strengthen our resilience to a 2°C scenario. We also broadened our reporting of physical climate-related risks and Scope 3 emissions.

We completed a Group-wide review of our climate-related risks and opportunities using the TCFD framework. This review informed a two-year roadmap to undertake further scenario analysis of key climate related business risks. We transparently and constructively engaged with Climate Action 100+ investor representatives and other stakeholders during the year, sharing our progress in aligning our efforts with the TCFD recommendations and building greater resilience to climate-related impacts.



Our approach to climate related risks

Energy and climate policy

Boral has not identified any major positions on energy and climate policy held by our industry associations that are materially inconsistent with Boral's position.

We support:

- **A national approach to climate and energy policy** to ensure that least-cost carbon emissions abatement is targeted while ensuring reliable and competitive energy can be delivered.
- **Climate and energy policies** that do not unduly erode the competitiveness of domestic based businesses.

Through our community partnership with Conservation Volunteers Australia, we support conservation and education initiatives in our local communities, including native vegetation initiatives in local reserves and schools.

In Australia, we are a member of the Cement Industry Federation (CIF). The CIF policy is to support the Federal Government's national target to reduce emissions by 26–28 per cent by 2030, and the CIF has been working with the World Business Council for Sustainable Development and its current roadmap to reduce emissions.

Boral acknowledges the Paris Agreement and supports mechanisms to achieve its objectives, including a national approach to climate and energy policy. Boral's major industry associations are:

- Green Building Council of Australia (GBCA)
- Infrastructure Sustainability Council (ISC)
- Concrete Institute of Australia (CIA)
- Australian Pozzolan Association (APozA)
- Business Council of Australia
- Cement Industry Federation
- Cement, Concrete & Aggregates Australia
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